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VOL. XIV MARCH, 1918 No. 9

War in Europe

By the Hon. Medill McCormick[1]

MR. SPEAKER, let me say, by way of preface to my remarks, that I have received word that the French ministry of war is sending to the House a large relief map in plaster of paris showing the front in detail, and that later, after it has arrived, if any Member cares to have me do so I should be glad then to answer questions in detail relative to the problems on the front.

And may I add that, as I have tried to compact within the hour allotted to me a review of the problem in Europe as those of us who went over there have seen it, I shall be glad if Members of the House will defer any questions until after I have concluded.

This war, like other long-drawn conflicts, falls into chapters of events. Such a chapter came to an end when Russia collapsed and America declared war. Russia went out of the war in the spring of 1917, while America will not go into it in earnest until the spring of 1919. There is in war, as in peace, a distinction between forms and facts. Russia has not made peace, but she no longer fights. America has declared war, but she has not begun to fight. We must see now that if Germany is not yet victorious neither are we winning the war.

The military task was never more simple nor more difficult than it is today. I have not seen Russia this year, but I have talked with Russians who represented the revolutionary government until anarchy supplanted it; I have talked with European socialists who went on official missions to Petrograd, with European statesmen who knew all that men could learn of Russia from messengers and dispatches, and among them I met but one who believed that we might hope for a Russian effort against the enemy this year or next. Russia is so disordered that if she cannot make war there is also hope that she may not be able to make peace, to supply the Hohenzollern and Hapsburg autocracies with food and labor to fight Russia's old allies and America; but if Russian radicals failed directly to help our enemies, still it was they who chiefly contributed to the unhappy events in Italy by releasing German guns and divisions, together with Hungarian divisions, for service on the western front.

"Our anvil is gone," the greatest of the active commanders among the Allies said to me; "to disintegrate the enemy forces without it we shall have to hammer all the harder. If you had come in before Russia went out, we should have finished this horror in a short year. If

[1]House of Representatives, January 7, 1918.

you had been ready when you came in, your pressure would have begun before Russia's disintegration was complete and Germany had increased her forces on the front." I quote this, not in the spirit of recrimination, but to emphasize what I have to say later about the great responsibility which rests upon our still inadequate organization for the war.

All through the spring and summer Germany was on the defensive in the western line. She had won nothing from Switzerland to the Channel, but, on the contrary, had suffered reverses and terrible losses of human material. Her enemies at last not only had her outmanned, but in a smaller but appreciable degree outgunned. Never did the strategic genius of the German general staff shine more clearly than when they resumed at sea, or rather under the sea, the offensive which they lost on land. Whether it succeed or fail, barbarous though it may be, the submarine offensive was a powerful flank attack. Germany was failing in the main theater; she struck at her enemies on their left flank, struck at the source of the power of England, the most formidable of her adversaries, formidable in wealth and numbers; struck at great England, unconquerable in undiminished reserves of moral energy and courage. It was a hazardous business, justified in German minds by their contempt for our moral fiber and by their knowledge of our military weakness. We joined our little sea force to England's greater forces to fight the submarines. It is too soon to say that we have mastered them. They may be improved; they may be better equipped to combat destroyers; their cruising radius may be increased; it may be that the rougher waters and shorter days of winter rather than the activities of their adversaries are responsible for the falling losses in merchant ships. At all events, during the late summer and early autumn the German public, like the German staff, saw that the submarines had failed in their full promise for this year. Then the imperial staff struck their adversaries again, this time on the right flank, in Italy. There is no mystery about that blow. In order to understand it we have only accurately to estimate the weakness and the strength of Italy, her achievement, and her failure, and the responsibility which we share with her European Allies for her recent defeat. Italy, strong in man power but weak in all other resources, had done well. Some of her troops had been proved the equal of any in the French and British armies. She had driven the Austro-Hungarian forces slowly eastward in the face of the great natural obstacles. All observers praised the organization with which she maintained her front in an incomparably difficult country. You must bear in mind that Italy labored under great handicaps.

In a war which is primarily industrial, Italy, producing no iron and no coal, received from abroad even less than her normal imports. Her shell factories, which should have been working night and day, were working but part time. In spite of her lack of war material she pushed the enemy to the north in the Trentino, and forced him eastward on the road which runs past Trieste to Laibach. She was seeking the old Napoleonic route to the heart of the Hapsburg monarchy. Ah; if she had been supplied with the resources to have driven through it! When I was on that front, Trieste was before our eyes. There were but two barriers between

us and the highway to the plains beyond. The sons of the Roman road builders had woven over the rocky and precipitous desert a network of splendid highways the like of which are not to be seen on this continent. Along those highways, for miles, in iron pipes, they carried water for the parched armies and compressed air for the tools to drive galleries, to drill out tunnels, to cut roads across the faces of sheer cliffs. But for lack of ammunition her advance was stopped.

The Austrians were weakening. Italian officers told me of the capture of Turks among the prisoners, Turks summoned by the imperial German staff to the help of faltering Austria. As Italy pushed painfully toward the eastern edge of the desert country her difficulties increased. Her advance had been stopped because she lacked shells. For want of shells and guns her long flank on the north was weak. When I was there, Hungarian divisions of real worth, together with German guns and German divisions from the Russian front, were being assembled for the drive which the Italians even then anticipated. They knew that they were in danger.

People were troubled by our course. They asked why we had joined hands with France and Britain and not with them, whose ideals and purposes were the same as those of the other western democracies. They asked why we had differentiated between the modern Hohenzollern autocracy and the more ancient, more obscurantist, more reactionary, and more tyrannical Hapsburg.

Italy expected the attack, but she did not look for the cowardice and treason of some of her divisions, which had been corrupted by the imperial spy system developed—in Italy as in America—while Italy stood by and watched the other democracies fight. They threw down their guns, those divisions, and Italy with her line broken had to fall back to the Piave.

There is a little satisfaction to be gained from the knowledge that the imperial staff achieved no great strategic success in Italy when they drove their enemies back to the line of the Piave. They made a political foray primarily for its moral effect and to relieve the pressure in the main theater of the war. Both of these results they accomplished. They cured Austro-Hungary of despair. They marched Italian prisoners through the streets of Berlin and restored the faltering faith of the German people in the invincibility of the Hohenzollern. They compelled the British and French to detach divisions and guns from the western line, where they were gaining, to assist the Italians in the plain of the Po.

If America and the Allies can profit by the lesson, we may yet count the German drive into Italy as a disguised blessing. Every thinking creature can now see, what too few saw before, that the front from the Adriatic to the Channel is a comman front. It is seven hundred miles long. Three hundred miles of it lie between the Alps and the Adriatic; 400 miles between the Channel and the Alps.

There are about seven Italians under arms for every ten men in the combined French and British armies in France and Flanders, so that the number of men is about equally proportioned to the lengths of the two great sections of the western line, but there is a great disparity in the distribution of guns. Even before the Italians lost a third or so of

their cannon, the enemy on the Italian front faced less than one-quarter as many guns as he faced in the hands of the British and the French.

If America and the Allies can learn anything from the past, if America awakens and does her full duty in the manufacture of vast numbers of cannon, Italy with her millions of infantry can be armed by us with the great weapons necessary to repeat on the Piave what transpired on the Marne.

When the drive into Italy was checked, for simple and cogent reasons, the imperial staff turned from Italy to France.

So far the submarines have failed to accomplish all that the imperial staff hoped of them, but the attack in Italy did very nearly all that was expected of it. Now, with unremitting energy, the imperial staff is assembling its forces to take the initiative against the French and British armies in the main theater, where a real decision must be had if there is to be any. They intend to win before we can make ready. They know that in France there is a minority which, believing that we bluffed before we declared war, believes or fears that we may prove bluffers still. The imperial staff must strive to induce France to make peace on that score—the score that America will not make ready in time. That is the reason why the front from the Alps to the Channel has assumed a greater importance than at any time since the battle of Verdun.

There is no military activity in the Vosges. So much of the front as lies south of the sharp salient of St. Mihiel has been quiet. One-third of the whole line is held by the British, against whom the Germans have mustered nearly as many divisions as there are opposed to the French. In passing, I may venture to remind you that there is a direct relation between the frequency of attack by the British as compared with the French and the greater concentration of men and guns of the shorter British line.

You have noted all through the summer a series of French and British successes. With a single exception the successes followed intensive artillery preparation, of which they were the direct result. If I venture to refer to certain of my own observations on the British and French fronts in some detail it is because I there saw the terrain of the two recent battles which exemplify the usual and the exceptional in modern attack. I traveled along the line upon which the British effected their advance toward Cambrai. The line before Cambrai was quiet, save for the singing of an occasional shell passing overhead. The monotony of an apparent stalemate was relieved only by occasional trench raids.

To the north the greater part of the British forces in guns and men had been pounding for months, while, as I have said, the French recently had made a savage attack to the south. Thus the German line before Cambrai had been drawn thin in the effort of the imperial staff to accumulate reserves to check the French to the south and the British to the north. Other reserves were not to be spared, for they had been dispatched to Italy. Then, when the attention of the whole world was held by the German thrust in Italy, Byng's infantry, with their tanks, in the thick mist of the autumn dawn burst through the thin line of sleeping Germans. It was a surprise; it was splendid; it was in keeping with the finest traditions of the British army, but, as General Maurice,

chief of the British military intelligence in London, pointed out, it was only the long bombardment below and above Cambrai that made possible Byng's dash forward.

A day or two after the news of the sudden British advance some anonymous expert in Washington was responsible for the published statement that we were planning to win this war with masses of infantry. Infantry there must be in great numbers. Men will bleed and men will die, but every man who has lived on that bloody line will say that with guns enough you can win this war without the terrible losses of the past, that without the guns you will lose thousands and you may lose the war.

In contrast to the drive for Cambrai stands out the bloody check which the French suffered last April. It is hard to learn the exact truth. Apparently the commander-in-chief (since disgraced), yielding to political pressure, thrust his infantry forward against the height of the Chemin des Dames without adequate artillery preparation. Then, when news of the subsequent losses reached the politicians, at their instance the general in chief precipitately and prematurely halted the attack. It was those fruitless losses before we came into the conflict which darkened the spirit and quenched the hopes of our friends in the republic across the seas.

How different it was this autumn. I had been running from Verdun toward Soissons. General Petain, the commander and chief of the French armies, sent for me to learn if I had profited by the special facilities afforded me for observation. I told him that from the lips of his principal commanders, as well as from what I had seen and heard in Italy, I had come to realize that this was a vast industry in which we were engaged and that big guns were the tools of the trade. I said that therefore I wanted to see with my own eyes, on as large a scale as possible, an artillery attack. He promised that it should be so. He did not tell me where, nor that it was to be the greatest bombardment of the war. He told me to return to Paris and wait. There had been bloody losses and no success in the spring; there had been no adequate preparation.

The last battle of the Chemin des Dames was planned in July to be fought in October. The French had laid well nigh a thousand miles of broad and narrow gauge track to bring up the great guns and the munitions for their service. They had brought in 110 freight loads of high explosives. There was a cannon for every three or four yards of the front attacked. For every two infantrymen employed in that action there were three men engaged in the service of the artillery.

We set out very early from the French great headquarters for the front along a highway checked with traffic; motor-driven or motor-drawn trucks, heavily carrying forward supplies of ammunition, horse-drawn light artillery, food convoys, field kitchens, stretcher bearers, ambulances, battalions and brigades, African blacks from the Senegal, yellow-skinned Asiatics from Annam and Cochin China, bronzed tribesmen of Morocco, soldiers from every province of dauntless France. At intervals, and each at a little distance from the grinding roads, there were the headquarters of the commander of the army of that particular front, of an army corps on that sector, each differing from the other only in size, each housed in a quiet villa. Every such headquarters was linked to

the other commands by wires, so that each commander could communicate with his chief or follow and direct every move under him, with his eyes on a relief map, which pictured to him hillside and hamlet, stream and farmhouse, highway, bridge, battery, and entrenchment.

We worked our way forward, the soldiers on the front seat pressing the slower vehicles to the side. Presently the traffic began to melt along the light railways and narrower roads which lead to the actual line. The main highway was clearing. The driver hurried the car and hurried it still more.

We could hear the voice of the battle softly calling, still far on. We raced past the nets of grass and leaves—camouflage—which, as the road neared the front, screened traffic from the enemy airplanes; turned up a rough road, over a steep hill, dropped down, and came to a stop under some bombed and broken buildings.

The air roared. There were waves upon waves of sound as thousands of noises overlapped one another, shaken together, rolling apart, as far as the ears could hear, even farther—as far as the senses could imagine hearing, while overhead the many airplanes looked like a flock of birds, and through the reverberations of the guns, their engines sometimes hummed like distant sawmills. There were no ear-splitting shocks, such as you have seen described. There are none save when you are near a battery or perhaps when a shell bursts too near, but the air was filled, saturated by the sound of guns, now and then punctured by the popping of the shrapnel overhead.

Before us was the Chemin des Dames, "the road of the ladies," the blood-drenched "road of the ladies," along which for months men fought and waited, in hate, to fight again. Picture a long, low, flat-crested ridge, its sides covered with forests and pierced by caverns—quarries really, from which stone had been taken for the building of Paris. Here and there the ridge widens into a larger mass, from which in turn run out spurs. Such a place was it that the French planned to take. Along the center of the flat top of the ridge runs the "road of the ladies," flanked on either side by wasted fields, once fertile with the minute care of the French husbandman. Across that road the advance posts of the armies faced each other. Beyond the ridge is a valley cut by a little stream and then another ridge upon which was placed a great part of the German artillery. Southwest of the Chemin des Dames there was also a valley and stream and another ridge, on which the French had found emplacements for so many of the guns as were not thrust forward on the spurs of the larger mass which it was purposed to attack.

We had stopped in front of a hut, partly dug in the ground, partly built of sandbags and roofed with railroad iron and still more bags of sand. A calm little man in the uniform of the general of a colonial division came forward to greet us. "Permit me," he said, as we shook hands, "to introduce to you our 'wrecking contractor.'" I looked at the "contractor" with some wonder, which doubtless expressed itself on my face, for the general of the division continued, "It is his function as chief of the artillery to wreck the batteries and defenses of the enemy so that our infantry, as it goes forward, may not be cut up." Then I sought to cate-

chize the chief of artillery, but our host interrupted to lead us to the sandbag and dugout hut, which was staff headquarters and mess hall for the division. The windows shook in the shocked air. In spite of us Americans, it was impossible to confine the conversation to the subject of the attack outside. The officers wished to question us as much as we did to question them. We talked of public opinion in France, England, Italy, and America, even of literature, although we were interrupted by officers coming to report news of the action. All the while the air shivered in the torture of the bombardment.

They are very calm and cool on the battle line, those French officers. I remember when I had persuaded the commander of the citadel of Verdun to let us go to the outermost defenses, we strolled along the very crest of Souville, looking down over the dip of the valley at the German batteries on the rolling ground beyond. I remarked to a French officer standing near, that considering the daily communiques of "more or less artillery activity," it was very quiet. Just then a bomb burst on the left. We did not purpose to indicate to our French companion that we were disturbed, so I waved my stick toward the enemy and asked where was the battery which sent that shell. Boom, went another just below us. "My friend," said the French officer, as he took his cigar from his mouth, "that is the way those devils always begin; high first, low next, bang through the middle the third time. Let us stroll along."

But to return to the Chemin des Dames, we walked along the front of the dugout and descended into a hole in the ground, which was the office of the wrecking contractor. It was not unlike the office of an American contractor for a big job. There were plain pine shelves, upon which were stacked little reports of munitions expended and damage done, for all the world like the reports of the number of square yards of earth excavated. There were neatly classified piles of little photographs taken by the airplane observers, showing the work of the French shells upon the German defenses and batteries. Certain officers became expert to read them, just as some physicians are cunning to diagnose disease from radiographs. There were occasional supplemental reports from rarely returning airplanes, while more came by wireless from the planes equipped with Marconi instruments, advising the artillery to sprinkle a little more to the left or lower on the right. There was one report that some German battalions had been definitely located hiding in one of the quarried caverns, on which the roof was too thick to be broken in by shelling, but not too thick to crack. Orders were issued to open fire upon it with the largest shells, filled with the heavy asphyxiating gas, invented by the Germans themselves, so that through the cracks which they might make, the gases could filter down and asphyxiate the men within.

When all this had been explained we moved down toward the front, first past the dugouts, where were lodged the infantry waiting for the attack to be made in the mist at dawn. There were guns behind, before, on either side. The screaming of our own shells overhead, to our untutored ears, could not be distinguished from the "arrivals," as the French dub the enemy shots. Then up past the final observation post and down to the last light batteries, just back of

the trenches. Here we closed our ears to the steady pounding of the guns that did the work—that is it, the guns that did the work. They blasted the way for the infantry; they destroyed the enemy batteries, overwhelmed, stunned, slaughtered the enemy infantry, so that on the October morning when the French advanced in the measured pace of modern charges, they took with almost methodical exactness that which was planned last July for them to take, and they took it with astonishingly little loss. Have I made myself clear? It is all so clear to me that I am fearful lest I omit something which may make it intelligible to others.

Great guns are to this war what the steam shovel was to the Panama Canal. When the French company, under De Lesseps, sought to pierce the Isthmus with shovels and picks and petty machinery, men died by thousands on the tropic hillsides, which they had but scratched. So fell hundreds of thousands at Mons, on the Marne, and at Verdun, who with their own bodies stopped the shells and stayed the charges which ought to have been stayed and stopped by the counter bombardment of their own batteries. Time is the essence of victory, and cannon are the weapons with which it must be won. We—we Americans—must make cannon enough, in time, to win.

I do not underestimate the other agencies necessary to victory. Men we must send slowly at first, because we can send them only slowly, to join our gallant little army across the seas. Transport there must be and aircraft—"the cavalry of the air," as Lloyd George once called them in Celtic poesy. Guns, transports, destroyers, aircraft—25,000 guns to be made by the forges of America to win the war. That is not a figure which I summon from my inner consciousness. It is the best military opinion in Europe. The general upon whose shoulders rests the heaviest burden said to me: "We are grateful for your little army. The echo of its footfalls on our shores carried hope to every hearth in France; it told us that you had not forgotten that the blood of the soldiers of Rochambeau and Lafayette mingled with those of your forbears in the fight for American liberty; but while we await the gathering of your forces send ammunition and guns to us, that we may have the weapons to win victories and to defend ourselves, so that we may still be here in force to fight by your side on the appointed day to win victory and peace."

We know that war is an industry of destruction, but though the industry almost has hidden the romance and heroism of war, heroes there are in greater numbers than ever before.

An old friend of my mother, a splendid American, Mrs. Whitelaw Reid, sent for me in London to ask of our boys. She had come from the bedside of a young British officer, who never would walk again nor would ever again be able to take a friend by the hand. He was almost merry in his misery; glad, for although he had been crippled for life by the bomb upon which he had thrown himself, yet when it broke not one of his men had been harmed.

General Pershing told me of a French lady, a nurse, torn by a shell. As he stood by her bed while the commander-in-chief of the French army pinned upon her breast the Croix de Guerre—the soldiers' war cross, with palms—she whispered to him, "General Pershing, I am glad that I have been struck, so

that you may tell your countrymen that the daughters as well as the sons of France are ready to suffer and, if need be, to die—die for her and liberty."

I spent a day in the Hindenburg trench with a splendid Irish division. As I sat at division headquarters with the gallant Irishman who commands them, we turned the pages of the long roll of honor, counting the names of those who had done gallant deeds. There was one, that of a simple private who was lying wounded in a shell crater when he espied over the lip of a ridge, in a near distance, a German machine gunner turning his deadly fire to and fro over the ranks of the fusileers as they sought shelter in the shell holes on that muddy slope. Up he jumped, dashed, limping, over the ridge, and brained the machine gunner with the butt of his rifle. He shouldered the machine gun and carried it back to the crater. Then, as he caught his breath, "Begorra," he panted, "I left me gun where the Huns can get it. The old man will be giving me hell for that." And out of the crater and over the ridge he dashed again. There he came upon two of the enemy quarreling over his rifle. He flew at them with fists and feet in such fury that both surrendered. He made them carry their own guns and his as well, and back to the crater he marched them and there held them until dusk, when he took them to the rear for surrender. He got, not hell, but the Victoria Cross for that afternoon's work.

Oh, there are no comparisons in gallantry along that line. Among the French there are none more brave than the others, Gascon or Norman, Breton or Savoyard. In the British armies, English or Canadian, Irish or Australian, Welsh or Scotch, none are braver or better troops than the other, where all are sublime. We shall be proud of our young men. They will reflect glory on the Union. They will be a credit to the men whose arms founded the Republic and those who fought in the sixties. In generous rivalry, where all are bravest, they purpose only to be bravest, too.

The spirit of the armies is indomitable. The French, in spite of their terrible losses, are grimly brave, believing that by our side liberty cannot lose, ready to give themselves in the last sacrifice for the future security of the world. They are brave. They are tired. They clearly know that promises are to be measured by performance. Let us not fail to do all that must be done, for their confidence in us must remain unshaken if they are to endure, terrible to their enemies unto the very end.

How can I speak of the still growing power of Britain, of the high, rollicking courage of her armies, better than to say that when I went among our men and found with them British noncommissioned officers, teachers of the deadly bayonet, professors of cold steel, each told me that the world owned no better fighting men than their brother in arms. Those lithe American boys will prove the peers of veteran armies. They have but two anxieties: First, lest they do not get at the enemy soon enough; second, lest the great body of the people at home lack something of the unity, the iron energy, and terrible resolve which moves the American soldiers at the front. "Tell them," they said, "tell the folks at home that if they will stand by us we'll can the Kaiser."

Sir, it is not possible within the compass of the time which the House so

generously has accorded me to measure the task before us. Even the most exhaustive analysis of the economic condition of Germany leaves ground for conjecture. Let me say only that as Germany plainly has been crippled for the economic contest which must follow the war, so no less plainly has she suffered awful losses of man power. During the summer German soldiers in increasing numbers deserted, complaining that during bombardments their officers left them in the front line to seek shelter in the dugouts connected with the second. We know from prisoners captured that in the summer of 1917 there were incorporated in the armies the military classes of 1918—that is to say, lads 17 years of age—while there were many so-called volunteers of the classes of 1919, mere striplings of 16, whose tears and stifled sobs wrenched the hearts of the Poilus and the Tommies who captured them. But I would not have you believe that there are not splendid German divisions, splendid in the efficiency imposed by the iron Prussian discipline. They were outgunned and they were outmanned still more, but the reinforcements brought from the eastern front will redress the balance. To the unity of purpose which actuates all the belligerents the Central Empires add a unity of command through which the imperial German staff directs the movements of the Turks and the Bulgarians as well as of the Hapsburg and Hohenzollern forces. We are fighting the German armies; we are fighting the German economic machine and the German administrative system. We who have tolerated inefficiency, because in a new country we could afford to do so, must now reckon that administrative energy and genius are as essential to victory as strategic skill. As the Allies have marshaled armies, so they have been compelled to organize industrially and politically to combat German militarism.

As Germany may be our apprentice in democracy, so must we be her pupil in administrative energy. Even in western Europe the hand of government is now omnipresent. It measures the food and fuel of the people, allots raw products to the manufacturer, lends public credit to private enterprise, writes the terms of settlement between employe and employer. Government has created new offices in Europe, as it has restricted the activities of the old, in order that they may bear the heavier burdens imposed by the war. In France and England the manufacture of guns has been taken out of the War Department, as it will be here if we are to profit by the lessons of the war. The task of organizing armies and of forging the instruments of destruction was too great even for the great Kichener, so Lloyd George, the ablest of the servants of all the enemies of Germany, was put to organizing the making of cannon and shell and shrapnel.

Government is planning not only for the war but for the economic reconstruction which must follow the war. Italy intends to double her developed water power as a state monopoly. Committees of French business men, their credit underwritten by the government, are planning the rehabilitation of her industries.

French scholars and public men have united to devise legislation to stabilize the government and to increase the birth rate. John Bull, the old merchant and mariner, has made the most far-reaching plans of all. He knows that

the world has changed, never again to be what it was before the war. Beside the other new ministers, he has appointed a minister of reconstruction, aided by committees, expert in manufactures and raw products, in problems social and problems industrial. John Bull plans also for the agricultural rehabilitation of his little island no less than he plans for the growth of his trade from the Bight of Guinea to the Gulf of Carpentaria. But most striking of all, he has already matured plans to build, at public cost, as the ink dries on the treaty of peace, 300,000 working men's homes. The slums, which disgraced English cities before the war, are gone, never to return. English workers, once chiefly interested to get a day off, are now eager to seize the new chances to get on in the world. Once underpaid, they now earn high wages. Girls in the shell shops are paid ten times the pittance they earned before the war.

It has been said that this is a war not of armies but of nations, yet until the eyes see and the ears hear it is not possible to know the measure in which the people have given themselves, body and spirit, to the conflict. The men from 18 to 40 years of age, if they be sound in body, have gone to the war. Boys have been called forward and old men called back to fill the places which the soldiers have left. Girls and young women have taken up the tools which the men have laid down. You see them everywhere, those high-hearted girls—in the stables and the shops, as conductors of omnibuses, running elevators, at work on railway trains, as messengers, as porters, as drivers of motor trucks. In France and England 2,000,000 of them are engaged in work for the war, while in England alone this year 200,000 women and girls, volunteers, went out from the cities upon the farms to garner the harvest. Crofters' lassies, daughters of old houses, girls from shops and from sheltered homes, like their brothers in the trenches, are knit together in the new democracy of toil. If in Europe they have suffered, so also have they been ennobled by self-sacrifice. Sir, there is no one of us in this House who, as his foot touched the soil of wounded France, but drew new strength from the well-springs of her courage. Nor is there one of us who saw in England the fusion of true idealism and hard intelligence but felt that never in her greatest hour was England greater than she is today.

Yonder the national spirit has been shot through with a new fire. In England, Italy, France, they began, as we have begun, with a party truce and a party administration of the war, but they have got beyond that and unite in the administration men of every great party unless they refuse to share in the responsibility of government. Whatever his legal powers may be, Lloyd George, deriving his authority from the people, directly responsible to their House of Commons, is invested with the moral authority of a dictator. But he sits daily in conference with his war cabinet of five—Smuts, the Boer general; Barnes, the labor leader; Curzon, the old Indian Viceroy; Carson, the Ulsterman; Milner, the Tory administrator. The old political elements are almost equally represented.

One of the greatest men in Europe, whose name I wish I might give this House, said:

You Americans will have to include in the administration of the war the greatest talent in America. You will have to call to Washington your greatest leaders, regardless of past political differences and past personal animosities.

Across the seas they were divided before the war by political differences more venomous than any which we have known since the civil conflict in the sixties, but the fires of a new patriotism, kindled by the awful struggle, have fused old hatreds into a common labor and fast cooperation. Men embittered by years of personal and political strife have put aside all bitterness to sit at one council table, there to apportion among them without jealousy the tasks which must be done.

In democracies the governments reflect the sober sense, the energy, and the courage of the people who choose them. So it was in Europe. The voice of the people of Italy, France, England, in louder tones and ever more imperative, demanded that the genius and leadership of the land be summoned to share in the government at Rome, Paris, London, there to muster the forces of the nation to the conflict. This must we do in America in order to mobilize and to direct the industrial and military forces of the greatest of all democracies. Our decisions, our promised successes, must not be stillborn, like so many of those of our friends across the sea. Idealism, democracy, great plans, will go for nothing unless they be supported by force and action. Let each of us contribute of his energy and let each, according to his conscience, speak out his measured opinion, to the end that his Government may act and greatly do before it is too late.

Cooperation between Infantry and Artillery in the British Army

By Major D. M. McRae, Infantry

Lack of Cooperation in the Early Stages of the War

For quite a time after the war began there was little or no cooperation between the infantry and the artillery, and, what was worse, there was a bad form of antagonism. This was due to a number of causes. In the first place, neither branch knew practically anything of the other and had no conception of the troubles that control the actions of the other. Both branches were prone to too much secrecy, and disastrous operations were carried out without the necessary consultations taking place. It used to be nearly a physical impossibility for an infantry officer to learn anything about the batteries covering him or to visit the artillery O. P.'s on his front. Another item in this awful misunderstanding was the shortage of shells. The infantry blamed the artillery, and the artillery were too touchy to take the trouble to explain.

Gradual Improvement

When matters were at their worst some genius must have taken charge, for an improvement was very gradual at first and rather half-hearted, but was soon going along full swing by leaps and bounds. Personal acquaintances between the two arms became the watchword. There were plentiful invitations from the infantry messes to the artillery messes covering them, and *vice versa*. As a result of these dinners, bridge parties, etc., and of the information gained here of each other's difficulties, each branch began to realize that the other was not entirely composed of a collection of grouchy "rotters," and that a large part of the blame could be laid on each side.

One of the first things noticeable was that where an artilleryman and infantryman met there were friendly words of greeting and mutual congratulations over a good piece of work done, instead of the old curses and black looks. But, above all, each branch began to ask the other questions, and would get pleasant answers.

This good work was greatly helped along by a series of good addresses given by artillery officers to the infantry, aid *vice versa*. From this time on it was a common sight to see infantry officers at the batteries and O. P.'s, and they were always certain of a warm welcome by personal friends. The author has the privilege of counting many of his best personal friends amongst the artillery that has covered the fronts he has been on, and recalls with great pleasure the times he has been allowed to fire different caliber guns into Fritz's back country. He is also certain that numerous artillery officers have enjoyed their trips to snipers' posts for the chance of a little hunting.

A big factor in the maintenance of the now almost perfect cooperation is the presence of artillery liaison officers in the front line. There is one such with each British battalion, and he doesn't just sit around the headquarters dugout. He is supposed to be the

shadow of the battalion intelligence officer, and follows him all over the frontage. These two work hand in glove for the discomfort of the enemy and the increased safety of our troops. They compare maps and at once correct any disagreement. The names and locations are checked of all sections of front-line trench, bays, posts, craters, gaps, etc., and any changes at once given to the artillery. Serious mistakes will be made unless these maps are identical, and it will be the infantry's fault. When the battalion observers locate an enemy battery, trench mortar or machine gun, the information is given to the artillery at once, and they pass back the information as to the result of their fire. Each branch has a pride in its share of the good work. The following incident that came under the author's notice will illustrate this close harmony in which the two branches work and which would have been impossible a year and a half ago.

Opposite the city of Lens there is a huge pile of slag from one of the coal mines, called the Double Crassier. It is a long mound, about 200 feet high and 1,200 yards long, with a very narrow top of about 8 yards and extremely steep sides. One end of this crassier is at our front line, and from there it runs across No Man's Land to quite a distance behind the enemy front line. We have dug a sap running up the end in front of us and a narrow trench along the top, so that the post at the end is about on a line with the German front line, down below in No Man's Land. The Germans have a sap on top also that runs up to within 10 yards of ours, but they were so close that a sort of *status quo* was established. From this wonderful watch-tower all the surrounding country could be seen, on the right clear down to Vimy Ridge and on the left to Loos.

There had been a number of successful raids against the Germans, who in consequence were very jumpy and kept numerous machine guns swinging over the whole countryside every night. These guns, while they did little damage, were an awful nuisance, and to some extent interfered with the nightly working parties who were in the open. Besides this, there were a number of large trench mortars (*Minenwerfers*), located very near the foot of the crassier, which had a habit of lobbying their huge bombs over the top of the crassier into the trenches of the battalion on the north.

While up on the crassier one night an officer observed the relief of a German listening post crawling out in the snow directly below him and took its position and the times of relief. Then a little surprise party was organized. Some artillery friends and one from the brigade machine guns were taken up on the crassier, and they immediately entered into the spirit of the game. (Right here it ought to be stated that when they have plenty of ammunition, as they always have now, the artillery are almost childish in the joy they take in letting off their guns at almost any old target the infantry finds for them.)

When the visiting officers had grasped the idea, a systematic effort was made to locate all the enemy emplacements and have these accurately registered in daylight from the crassier. This registration was done in such a way as to lead the enemy to believe it was just desultory shelling. The brigade ma-

chine guns were then accurately registered on the path taken by the relief of the listening post. This was done by watching the bullets kick up the snow. When this work was done a "tug wire" was rigged up from a good observation post on the crassier along the top and down the back to a place where a man with a signal lamp was invisible to the enemy, but could be seen from an artillery observation tower in a town well to the rear. In this tower was an artillery officer with a set of push buttons that connected with the different batteries.

When all was set and it was dark, an infantry officer crawled out to the observation post, tugged a few times on the wire in his hand to see if his signalman was on the job, and then waited for developments.

The first thing to happen was for one of the trench mortars to go off. The flash had hardly died away before one tug was sent back, one flash given on the lamp, one button pushed in the tower, and four 4½-inch shells landed on the trench mortar emplacements. This must have surprised the enemy, but didn't quite put him out of action, for he fired once more, and the same process was repeated. He was never heard of again.

Practically the same thing happened to the other trench mortars, and then the German machine guns started their nightly song. They received the same treatment as the trench mortars. A machine gun cannot very well compete with a salvo of well-placed 3-inch shells. There was no more machine-gun fire for days, and then they would just fire short, tentative bursts to see what would happen.

The serious part of the work now over, there was a lot of amusement caused by playing with the relief for the listening posts. Every time they would try to crawl out a well-directed burst of machine-gun fire would land on them and they would slide into a shell hole. If one man lifted his head, the gun would open. It must have caused a lot of surprise and wonder as to how a machine gun about 1,200 yards away could see to fire at the slightest movement of one or two men on a dark night. It probably never entered their heads that a Canadian infantry officer was lying straight above and could see every move against the snow. This very interesting game continued for some time, until a man with a rifle couldn't resist the temptation any longer and shot one of the Huns. This might have put them on to the game at once and broke up the *status quo*. Shells began to remove the top of the crassier, so the game was called off for that evening.

This is given just to show how all the branches can work together and cause a great deal of local damage. When this kind of thing is extended over the entire front it amounts to something. This was done under very special conditions, but other conditions and other opportunities exist at other places and must be utilized whenever possible.

The guns on any corps front are composed of the corps' heavy artillery and the lighter guns, of which, on a corps' frontage, there are three divisions of field artillery in the line and one in the reserve. A division of field artillery covers an infantry division, and is composed of three brigades. A group of the corps' heavy artillery is also assigned to an infantry division. A brigade of field artillery covers an in-

fantry brigade. It has fewer guns than a brigade in the United States Army. A battalion is covered by its group of guns.

In case an offensive is being planned or the enemy is planning one, the artillery is greatly concentrated and absolutely no estimate of the guns covering a unit can be made.

Any infantry officer in the front line can call for the fire of the field artillery brigade covering him, but he cannot call for fire from the corps' heavies direct. This last call goes through battalion headquarters and the brigade headquarters, and sometimes even has to go through divisional headquarters, according to local arrangements. This takes a very short time, as special arrangements have been made to facilitate these messages. This indirect method only applies to retaliation or straffing fire, for if an S. O. S. signal is given everything opens up at once.

Information That the Infantry Should Give the Artillery

(*a*) As mentioned above, they check up maps and at once let the artillery know of any changes in posts, etc.

(*b*) Distinctive signboards should be put up against the parados of different sections of the front line, as it is very difficult to tell our trench from the enemy's when looking from an observation post.

(*c*) Immediately send in any bearings of trench mortars, machine guns, or batteries obtained, giving map locations of point the bearing was taken from and time taken. You may only get one bearing, but others with other bearings may send theirs in and give enough data to locate the target.

(*d*) In calling for retaliation, the enemy rate of fire and caliber of his shells should be sent back so that our artillery can know what size and rate to use.

The principle of retaliation calls for a faster rate of fire with larger shells than the enemy is using. Often a big artillery fight will start from a mere trifle; perhaps someone will heave over a trench mortar bomb; the other side sends back two, which compliment is returned by four. Next, some artillery is called in, and, beginning with 3-inch, they work gradually up the scale until the 15-inch may even get in the show. Then everything goes full swing, the infantry of both sides being the target, until one side calls quits and gets its artillery fire to die away.

It is usually the German who gives way, both because his *morale* is not as good and he is weaker in artillery power than the Allies. After the German guns let up, we usually pound for a while longer and then quit ourselves. After a few experiences of this kind, the Hun infantry will be loath to call for his artillery fire and will take a certain amount of punishment without coming back stronger. We find out this limit to his patience and work right up to it.

(*e*) Any movement of the enemy that any infantry officer may detect or suspect, especially working parties, ration parties, or, above all, reliefs, should be gotten to the artillery, through the liaison officer, as quickly as possible. This is just the chance the artillery is looking for, and at night the infantry are the ones who discover these things.

(*f*) The following is descriptive of what an infantry lieutenant may have to do any night, and was worked very successfully, to the author's knowledge:

A German wiring party was seen, and the men in the front line were not al-

lowed to fire. If they had opened up, the chances are that no Germans would have been hit, as it was night and the fire would have driven them into their trenches with no damage done. The infantry officer decided on a zero hour, and put three Lewis guns in position, with orders not to fire until the time specified. He then ran down to the trench mortar headquarter's dugout and arranged for them to fire at the same time. Next, he got hold of the artillery liaison officer and arranged for the artillery to open at the same time.

At zero everything let loose in a short burst all together, the idea being to get over all the explosives possible in the short time it would take the party to get from their work into their trench. From the cries, the fire was highly successful.

The following are some of the things that an infantry officer must take the trouble to find out for himself:

(*a*) What batteries are covering his front.

(*b*) Where the liaison and F. O. O.'s dugouts are.

(*c*) S. O. S. signal.

(*d*) Where the trench mortar dugouts are.

(*e*) Barrage lines (S. O. S.).

(*f*) Forward observation posts.

(*g*) Quickest way of getting in touch with his artillery.

The artillery covering him is just as much a part of his defense as his men and Lewis guns, and he should know how and when to use it just as well as he does the other weapons at his disposal.

The following are some of the things the artillery must be certain to tell the infantry:

(*a*) When their range will be dangerous to the front line or outposts.

(*b*) When a shot will be likely to bring heavy retaliation and what steps have been taken for a counter retaliation.

(*c*) Any changes in disposition.

(*d*) Any changes in barrage lines, S. O. S., or retaliation program.

Short Rounds

(*a*) These were the cause of most of the grievances of the infantry against the artillery, and this grievance was mainly due to the fact that the infantry didn't know the reasons for these shorts. They felt certain it was due to the gunners' carelessness. They now realize that this is so rare as to be negligible. The main causes for short rounds are:

1. Defective ammunition (charges or fuses).

2. Error of gun (50 per cent and 100 per cent zone error).

3. Heated or worn gun.

4. Prematures.

5. It may not be the guns covering your front.

(*b*) Immediate steps to be taken:

1. Do not lose your head.

2. Withdraw men if fault continues.

3. Advise artillery. Do not start the conversation by a flow of profanity. It will take just that much longer time to reach an understanding, during which time you and your men are apt to be hurt.

4. Give artillery, as accurately as possible, map location of bursts, type of shell, height of bursts, angle of fire, number of rounds and time. If the above procedure is followed, the matter will be quickly corrected, and you will invariably find out it wasn't the gunners' fault.

Cooperation During Advance

It is during the advance that the infantry reaps the benefit of their efforts at establishing cordial relations with their artillery. Without the most perfect cooperation, the best trained infantry is lost.

Before the attack the infantry can be of immense assistance to the artillery in locating enemy batteries, trench mortars, machine guns, observation posts, etc., and in reporting on the results of wire cutting. Since the infantryman's life depends on the excellence of the artillery, it is up to him to use every means, day and night, of getting all the information possible to the artillery. The trained scouts and observers do a good portion of this work, and just before an offensive the battalion intelligence officer is one of the busiest and most important men on the front. He is a sort of general information bureau for his frontage, and must be fully prepared to answer the most minute questions as to his own and the enemy's lines.

He will be called upon to give lectures to the battalion on the nature of the ground behind the enemy front line, as determined from observations, maps, and air photographs. He will have to take all kinds of staff officers to his observation posts and explain everything in detail. He will have to run the patrols all night and the observation posts all day. There is practicaliy no sleep or rest for this officer at this time. It is on his shoulders that most of the responsibility rests for the close touch kept with the artillery.

When the attack has once gotten to its objective, it is of vital importance that the artillery be notified at once as to just where our lines and the German lines are. It is no use calling for S. O. S. fire when the counter-attack comes unless the artillery knows just where you are. They cannot put down a barrage without knowing where to put it. The best way to give them this information is by means of a sketch, showing your position and that of the enemy as far as possible. These little sketches can be all drawn, except the actual line, before the attack starts, and take only a minute to complete. Information of when and where your battle patrols are being sent out must be given to the artillery at the same time; otherwise they may be cut up badly by our own fire.

A method of locating our lines that is in common use now is by the use of air maps. A contact machine is assigned to a certain sized unit, usually about one per battalion or brigade, and it flies over low at prescribed times, say, once an hour. At these times it sounds a succession of "G's" on its Klaxon horn, and the infantry then light flares all along their front. The airman puts in the line on his map from these flares, and after taking any visual messages sent flies back and drops his information at a report center. From here it very quickly gets to the artillery.

The subject of the best means of communication in assault has been covered so fully by so many experts that it will not be touched on here, except to say that it is one of the most important features of the assault, and, if not properly arranged for beforehand, will be very likely the cause of losing much, if not all, of the ground taken when the counter-attack is launched. Only too often the success of the entire operation depends on the quality of the information sent back. If an infantry officer hasn't a clear conception of this

work, for his own sake and the sake of his men, he should at once make every effort to get some of the War Department publications on the subject. The information he will get from an hour's reading may very well mean the difference between success and failure in a few months' time.

In concluding this subject of cooperation, it may be again stated that it is the infantry who receive the greatest benefits and whose very lives hang on it, and therefore they must not sit around and wait for the artillery to open negotiations, but must get up and start things. They should drop the banter at messes that is so noticeable at present. While done only in fun, it tends to draw a line between the artillery officers and the infantry officers. In a mixed mess you will notice that one branch sits on one side of the table and the other branch on the other—a kind of mobilization for the battle of witty remarks that takes place at every meal.

This is wrong, and, while apparently harmless in peace conditions, may have very serious results in battle. Get together. Both branches are members of one big service, each by his own work, aiming and helping toward one big result—the destruction of Germany.

Company Administrative Work

By Captain Bloxham Ward, Infantry, U. S. Army

UNFORTUNATELY none of our sources of information concerning the war in which we are engaged deal with the administrative work that regulations and customs require of company commanders. What will we do with the field desk and its precious(?) cargo of records? Will it be taken along to the front line trenches or will it be kept with the reserves? If the latter, how can the organization commander submit those numerous returns and reports required in Washington and elsewhere? If the former, it will make life most interesting for the company clerk. Imagine him charging madly across a shell-swept section of No Man's Land with his field desk under one arm anl his typewriter under the other. If he negotiate a safe passage without having his records torpedoed, he will doubtless set up his office in a shell hole where he will train his typewriter on a muster roll or other record and open a destructive, though not necessarily an accurate, fire. Of course, if the attack is some time between the 5th and 25th of the month, he will not have to be in such a hurry, but if it comes between the latter date and the end of the month, he will have to hustle.

Our system of paper work is a peace system. Of course, papers are necessary. No business can be conducted without them, and the conduct of an army is business on the largest scale. Admitting this, officers of the line cannot but feel that the paper work required is prescribed by men who are concerned with administration rather than preparation for war. In paper work, as in equipment, either everything which may be called for can be required or only what cannot be gotten along without. The second is the safest solution, for it means mobility, and without mobility a collection of armed men may be a comfortable and well-governed community—it is not an army.

If our Army existed for no more warlike purpose than cutting the grass or providing employment for the mistake hounds in the various departments in Washington, we could struggle along until the crack of doom without further changes in our system of paper work. However, we are expected to go over to France, where it is quite likely that we will spend weeks in damp trenches where the typewriter will rust and the water rats will eat up the records. What is to be done about it?

The remedy suggested for this condition is to keep the live records at Division Headquarters and store the dead records in Washington in the custody of the Adjutant General's Department. There is no reason why a company should be burdened with the records of men who have long since been separated from it, nor should it be burdened with the live records of its members if it can be avoided. Mobility is one of the most desirable qualifications of a fighting unit, and it certainly is a fact that the lighter they are loaded, the faster they can move. Since the company *is* a fighting unit, and by all accounts the most important one, nothing should be left undone to raise its

efficiency to the highest point. If total relief from all paper work will do this, it should by all means be done.

When a company takes the field, it must store all its dead records and some of its live ones, and if it is on a duty that requires great mobility, it must store all of them. In other words, a system that functions perfectly in a certain situation fails completely in another. One of the fundamental defects of our military system is that it is organized for peace rather than for war. Our normal life is garrison life, while camp life proves to be so unusual and upsetting as to require weeks of previous preparation and the inauguration of a complete new system with voluminous orders and instructions. In this connection it would be most interesting to know how the records were kept by the company organizations that composed the Punitive Expedition into Mexico.

In suggesting the division as the proper repository of the company records, I have been influenced by the following salient facts:

1. The burden of administrative responsibility should be removed completely from the shoulders of the company commanders.

2. Division Headquarters is close enough to the firing line to be accessible to all the companies, yet it is far enough to the rear to be insured against sudden shifts of position.

3. The clerical force at Division Headquarters is capable of being better organized for efficient work than that of the company, and will have better and more permanent facilities for working.

4. The records will be much safer and much more accurately kept at Division Headquarters than at Regimental Headquarters or in the company. This is especially true of companies of the National Army, whose commanding officers have had little or no experience in keeping records.

It would be an easy matter to organize a clerical force and install sufficient facilities at each Division Headquarters to take care of the paper work of all the units in that division. Each unit should have its own field desk in which its records are kept posted up to date and filed. If a company is transferred from one division to another or to a separate brigade, its records could be packed at a moment's notice and transferred to the new headquarters, and if a company is placed on some duty not under any division, such as guard duty at a base, its records could be turned back to the company while on such duty. This gives a system that will be workable under any circumstances.

The problem, then, is to place accurate data in the hands of the division adjutant, and to do this promptly enough to enable him to keep the records up to date. In order to do this, it is suggested that a modified form of morning report, called a daily strength report, be used. This should be a blank form similar in general make-up to the commissary sales slip pad, and of a size suitable for carrying in the shirt or coat pocket. It should be ruled somewhat like a page of the present morning report with ample space for remarks. Each morning, as soon as the company commander had determined by roll calls and inspections just how many effectives he has for duty, he would make out his daily strength report in triplicate; the original would be sent by messenger to Division Headquarters, where the data that it contained would be transferred

to the proper forms and the report filed. The first copy would be turned over to the battalion commander, who, after determining the effective strength of his unit, would forward the reports of his battalion to the regimental commander, who would utilize them for a similar purpose. After having served this purpose, these records would be of no further use and could be destroyed. The tissue copy would be retained by the company commander and used the following day in making out the next report.

The method outlined above affords a simple and easy means of transmitting the necessary data from companies to Division Headquarters. In cases where, for any reason, a messenger cannot reach the company, this data can be sent over the telephone, by wireless, or even wigwagged. This strength report can be made to carry all the data usually found in such regimental orders as change the status of officers and enlisted men. For example, the colonel of a regiment desires to transfer John Doe and Richard Roe from Company A to Company B. Instead of getting out a written order, he issues a verbal order to each company commander directing the transfer. When the next strength report is submitted, each company commander shows, in the space for remarks, the notation that the transfer was made by verbal order of the regimental commander. Upon receipt of this information at Division Headquarters, the necessary shift in the records would be made.

This method, as outlined, would relieve the company of the work of keeping the service record, making out the muster and payrolls and monthly returns, and keeping the correspondence files. The only other records would be the file of orders, the company fund book, the sick book and property accountability records. Of these, the order file may be safely transferred with the other records and kept there, as 99 per cent of the orders that pertain to companies have to do with keeping records or in changing the status of some one in the company, while the other 1 per cent contains training instructions. The commander can carry the 1 per cent in his pocket. As for the company fund book, its entries can always be put off to a more convenient season. It is not believed that an inspector would go into front-line trenches and interrupt a battle to inspect the company fund. Moreover, there should be no company fund. It places a burden of responsibility upon the company commander that he should not have. The ration is quite ample now to give men all they need in the way of food, and their pay is sufficient to provide for all their other necessities. The other records, however, cannot be so readily disposed of.

The sick book, in some form, must be kept both for the information of the company commander and the surgeon. It is believed that a blank form similar to the daily strength report would be most satisfactory. The surgeon would make it in triplicate, forwarding the original to Division Headquarters, the first carbon to the company commander, and keeping the tissue copy for his own record. The following form is suggested:

SICK REPORT FROM .....
(Name of dressing station or hospital)

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FROM: (Name of surgeon taking sick call.)
TO: C. O., Co. "A," 101st Infantry.
SUBJECT: Medical treatment.

You are informed that the following named officers and enlisted men of your company received medical treatment from the above medical unit this day.

The disposition of each case is indicated below.

Name	Rank	Advance hospital	Sick in quarters	Base hospital	Duty
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....

This can be filled in by the N. C. O. who goes with the sick men, or anyone else available.

PROPER ACCOUNTABILITY

We come now to a phase of the administrative work of a company that has probably done more than anything else to reduce us to a state of incoherent profanity and cause our belief in the intelligence of man to waver. Quite recently some attempt has been made to alleviate this condition by providing for a regimental supply officer. It is not believed, however, that this will give much relief beyond providing a tangible personality upon whom we can vent our profanity when we are caught short by a bull movement of property caused by the imminent approach of the inspector. The inflexible rule that all shortages, not satisfactorily explained, must be paid for forthwith, has invested this part of an officer's duties with an importance out of all proportion to their real value. The staff departments that issue property have imposed most stringent, and, in most cases, complex rules for accounting for same. Every precaution is taken to insure that the accountable officer makes away with nothing belonging to the Government. Nothing is trusted to his sense of duty or discretion. He is apparently given no credit for having a desire to safeguard the interests of the Government. As a result of this valuation placed upon our sense of duty, we actually acquire somewhat the point of view that we are credited with. As a general thing we do not worry about the property interests of the Government unless we are in danger of suffering personal loss thereby. As a result of this state of mind, the pursuit of property has become our most absorbing occupation. We measure the efficiency of our quartermaster sergeants by their ability to rustle a surplus of

everything we have on paper. On more than one occasion, in taking command of a company, I have had the retiring company commander say to me, "Our quartermaster sergeant is a peach; he is ahead on nearly everything." I recall one such sergeant who had a complete surplus ordnance outfit for each man. How did he get it? I do not know. The fact that he had it and that his company commander rejoiced in that fact shows our state of mind. Another quartermaster sergeant was suspected of keeping a branding iron hot all the time with which to brand any property that happened to fall into his clutches.

Suppose that, instead of having all this "fol-de-rol" of returns, memorandum receipts, unit accountability reports, reports of survey, etc., each soldier should be required to sign a receipt for the property necessary to equip him. Suppose these receipts were filed with the company papers at Division Headquarters. This would enable the division adjutant to keep an accurate property account of the men in his division and to make the necesssary charges on the payroll for articles lost, destroyed, or damaged through neglect. Whenever a company commander discovered that an articles of equipment had been lost, destroyed, or damaged beyond further use, he would note it on his strength report, adding the word "avoidable" or "unavoidable," as the case might be. If the former, the cost of the article lost, destroyed, or damaged would be charged against the soldier on the next payroll; if the latter, a true extract copy of the strength report would be furnished the division supply officer as a voucher for dropping the same from his return. In either case the division supply officer should take steps to issue another article immediately without waiting for a request. There is certain property not issued to any individual, and for which the company commander must sign. Examples of this are kitchen utensils and the guns and caissons of a battery. If any of these articles are lost, the battalion commander should make an investigation and note the result on the strength report of the company commander over his own signature. In case the company commander decides to appeal, he should note that fact on the same report, whereupon the division adjutant would delay final action until an opportunity could be afforded for a written statement in appeal.

Such an arrangement would enable each company commander to report daily regarding his equipment, and to take the necessary steps to have any lost or damaged articles replaced. It protects the Government, because there is provision for charging the individual the cost of articles lost through carelessness. True, it leaves it to the company commander to say whether or not the loss or damage was unavoidable, but there should be no objection to this, as the officer is disinterested as long as he is not accountable or responsible. I believe that company commanders can be trusted to determine the facts in any case of loss or damage, and that, if they are shown that confidence is felt in them, they will make every effort to safeguard government property, and will do, from a sense of duty, what the Government has for years been trying to make them do by surrounding them with safeguards and restricting them with checks and balances.

A suggested copy of the daily strength report, with a sample of the data to be

shown thereon, is given on this page.

It will be noted from an examination of this blank that a commander can furnish a daily history of his company, both as to personnel and matériel, and can place in the hands of the division adjutant accurate data duly authenticated, from which a most complete record can be kept. There would, doubtless, be particular occasions when the company commander would have to do special work of a clerical nature, such as making out insurance or allotment applications, but even that could very readily be attended to by a clerk sent to each company. It is certain that it would relieve the company commander of his greatest burden, and enable him to play more completely the rôle that all the rules of tactics prescribed for him—the commander of a purely fighting unit.

STRENGTH REPORT

COMPANY: A. REGIMENT: 101st Infantry.

AT..... 191

	Present								Horses, driving		Horses, riding	
	Officers	Non. Com. Officers	Cooks, etc.	Privates first class	Privates	Prisoners	Sick	Absent	Serviceable	Unserviceable	Serviceable	Unserviceable
Members—Co.....												
Attached—Duty.....												
Attached—Rations.....												
Total.....												

No. Serviceable Rifles..... Ammunition Rds.....

No. Hand Grenades..... Rifle.....

REMARKS: Pvts. John Doe and Richard Roe transferred from Co. "A" to Co. "B," O. R. C., Pvt. James Anderson lost one rifle, Springfield, avoidable. David H. Wilson promoted from Cpl. to Sgt., per O. R. C., per Pvt. John F. Coulson reduced same date. Pvts. Joseph S. Bain and Paul C. Barker from duty to advance hospital.

....,
Captain 101st Infantry,
Commanding Company.

The Battle Control for the Rifle[1]

A Neglected Means of Increasing Infantry Efficiency Many Fold

THE inefficiency of massed rifle fire at fairly close range has been a matter of observation and comment ever since battles were first fought with bullets. It seems that no amount of preliminary training, no possible adjustment of battle sights, can eradicate the inborn tendency of the race to hold a rifle too high when working under the slightest stress. The disintegrating effects of battle conditions are widespread; nowhere are they more real or more disastrous than in their influence upon rifle fire.

That the difficulty really is one of holding the rifle too high is clear from the most cursory compilation of authorities. Uniformly the statement is made that fire at long range was effective, while at shorter distances it became less and less so. Alike in the Franco-Prussian War, in the Crimean campaigns, and in the Russo-Japanese conflict, it was found again and again that losses from rifle fire at ranges well above 1,000 yards were serious, while from 500 yards down they were remarkably small, sometimes ceasing altogether. Thus, at Beaugency, in 1870, a French battalion fired at close range for half an hour at a German company lying down, and the net result of their efforts was one man hit!

As the last word in proof of the point, we may cite the record made by the Boers at Colenso. Conditions here were favorable beyond any reasonable expectation. The Boers were skilled shots, the action was fought in full daylight at ranges under 1,000 yards, the Boers were not under a severe fire, and their enemies were thoroughly out in the open and exposed. Yet with all these advantages, the best the Boers could do was one hit in 600 shots fired, and, so far as we can discover, this is the world's record for accuracy in battle fire! The law of probabilities makes it certain that if the Boers had had the proper angle of fire they must have done better than this.

It is at the short ranges that the fiercest fighting occurs, and it is here that battles are won and lost. Formerly one of the first requisites for a good infantry position was an open field of fire, several hundred yards in depth. But the searching power of high explosive shells fired in great volumes has forced infantry to seek cover from vision in order to gain cover from fire; it must hide during the terrific shelling and be ready to repel the assault that follows. Often 100 yards or even less is the greatest depth of fire attainable; and since an assault will cross so short a space in a very brief time, it is obvious that the defense must make every shot count. The failure to do this with the rifle has led to the new vogue of grenade and bayonet—the one to give a fire effect certain to lie close to the ground, the other as a necessary last resort in view of the uncertainty of fire.

Now bayonet and grenade are good weapons in their place, and they have,

[1]Reprinted by permission from *Scientific American*, December 22, 1917.

in modern warfare, a very definite place. But is the failure of the rifle a final one? Certainly this arm possesses potentialities of long-range destruction which are not inherent in the grenade, even more emphatically not in the bayonet. We have recently heard a tale of a clash between small forces of British and German soldiers in the open, at a range of 100 yards. The Germans turned and fled; the British, armed with loaded rifles, fixed bayonets and frantically pursued the Boches, endeavoring to come within bayoneting distance, or at least within grenade range. The possibility of shooting the fleeing enemy never occurred to them, so far have they got from looking upon the rifle as a shooting iron; in their hands it is nothing but a handle for a bayonet. And presumably, if they had opened fire, they would have shot far above the heads of their foe. Their failure to realize the possibilities of the rifle, inspired by traditional ill success with it, put it out of their power to damage an enemy at this ridiculously short range. Surely this has gone far enough, and it is time to call a halt. As a first step, we may well inquire whether it is not possible to overcome in some way the tendency to hold this arm too high.

Col. Frank D. Ely, of our Army, has for years been engaged in a constant but losing endeavor to interest the ordnance officials in a device which he claims will do just this. Its mechanical features are of no great import here; enough to say that it is an attachment to be put on the rifle, which will add but 2 ounces to its weight, which is fool-proof in every respect, and which makes it impossible for the rifle to be discharged when held higher than a given angle. It is not rigid; that is to say, the angle at which it permits fire is controlled at will by adjusting the device. Accordingly, it can be used at any range, and even for shooting up hill or down hill. This adjustment is the work of but a moment, and so simple that any man who can learn to shoot a rifle at all can certainly learn to do this also. Colonel Ely calls his invention the battle control, and has

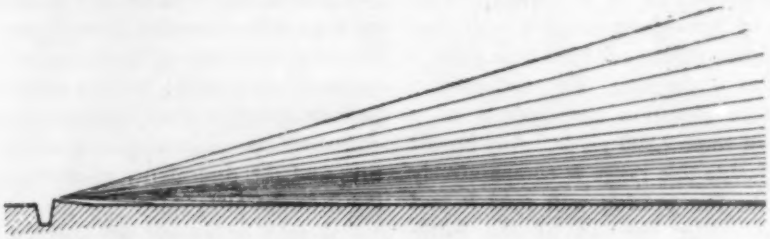


FIG. 1.—The normal cone of battle fire, when the rifle is used without any artificial restraint.

FIG. 2.—The deadly concentration resulting from Colonel Ely's fire-control device.

got out a little pamphlet in its behalf, from which we borrow the diagrams on this page.

The normal cone of battle fire is as shown in Fig. 1. The vertical dispersion is enormous—even greater than one would be led to suppose from the bare statements already made as to the inaccuracy of battle fire. It was actually demonstrated by Wolozkoi that the mean of fire—the average elevation at which the soldiers will hold their rifles—is about 4 degrees. For the modern rifle this elevation corresponds to a range of some 2,200 yards. Any hostile force inside this range is comparatively safe, the fire passing well over it and beyond. The function of the battle control is to flatten the cone, bringing it close to the ground, as in Fig 2. Every bullet in this flattened cone has a continuous danger space throughout its path; it may not meet a hostile soldier but it can miss him only by going between him and his neighbor, never by going over his head. It makes its strike on the battlefield, instead of a mile away.

The battle control is a simple mechanical improvement in the lock of the rifle which absolutely prevents discharge if the rifle is held too high—which is to say, if it is held above the angle for which the control is set after the range has been determined. The rifle simply cannot be fired until the aim is properly lowered and the trigger pulled again. When this correction in aim has been made, the control causes not the slightest diminution in the volume of fire that can be delivered. There is no change made in the existing methods of sighting and firing; all the control does is to prevent the shots which would be wasted, and force the rifleman to fire at the proper range. Nor does the device interfere with the normal use of the rifle; for it can be set "on" or "off" at will, and when "off" has no function —the rifle is then the normal rifle.

It is not even necessary to take Colonel Ely's word for it that the control is mechanically satisfactory. Mechanical experts, civilian and military, including the present superintendent of one of our greatest arms factories, have passed on it and pronounced it O. K. in this respect So that only questions which can be considered as at all open are its performance in increasing the effect of fire, and the desirability of incorporating it in the army rifle.

Colonel Ely himself has covered the first of these points. He has shown us the records of a test made with blindfolded riflemen—blindfolded in order that no opening might be left for a claim that the results achieved were due to aiming, and that accordingly the comparison should be with target practice rather than with battle fire. These blindfolded men shot at a single row of twenty-five kneeling silhouette targets, and they scored 4 per cent of hits. It requires no great knowledge of higher mathematics of ballistics to deduce that this showing is twenty-four times as good as that of the Boers of Colenso—which was the best previous record for fire under battle conditions.

So much for performances, and our preliminary remarks have certainly demonstrated the need for a device of this character. The only question left to answer is: Why has not this device been adopted and incorporated in our service rifle? One reason is that after a trial at the School of Musketry at Monterey, the director, while admitting in his report all the advantages claimed

for the control, recommended against its adoption because it was "not an instrument of precision"—precision being the hobby of this school. Such a remark, if it possesses any meaning at all, can only mean that the whole purpose of the control escaped the understanding of the men who had its fate in their hands, for of course it is not an instrument of precision. It does not claim to be one. The sight is an instrument of precision, and it is enough in this direction; if a soldier won't or can't use one instrument of precision to advantage, he certainly won't use two instruments of precision. The fire control is not intended to supersede the sight, as the worthy director perhaps feared; it is merely designed to supplement the sight and to control the fire when effective use of the sight alone is out of the question.

This wholly inadequate report has so far operated to seal the fate of the battle control. Whenever the subject is now put forward, the Ordnance Bureau refers to the Monterey test as conclusive and satisfactory to it; occasionally descending to the good old plea, "If the infantry wants this control, why don't they ask for it? We will build anything the infantry wants." This, of course, is begging the question altogether, for how can the infantry say whether it wants a thing which it has never seen, but knows only from hearsay?

Until the Ordnance Bureau builds enough rifles equipped with the control and issues these for a thorough demonstration and test by a thoroughly representative board of infantry officers, the infantry will certainly not ask for it; and until the infantry asks for it the ordnance people won't build it; so the matter is plainly running around in a circle like a kitten chasing its own tail, and can never reach any point outside the circle.

Mauled and smothered by the artillery, with her prestige threatened, the battle control appears to be the infantry's answer—and a fitting one—to what has become an intolerable situation of blindness under deluge of shell and smoke and gas, of comparative vulnerability to attack in storm or darkness. The battle control meets all those difficulties by sending the bullets of the infantry along a straight line close to the ground, in which they can meet and stop anything that lies between the beginning and the end of their path, instead of sending them in a curve which only comes low enough to do damages at the point of descent—and in which that point of descent is usually far behind the supposed objective. Shall lack of intelligent investigation, requiring little time and little expense, keep us from gaining a tremendous superiority of fire over the enemy?

The Harnessed Power of the Trajectory

By Colonel Frank D. Ely, N. A.

THE greatest problem in infantry training is the fire training; and the greatest difficulty encountered in fire training is to make troops hold low so that fire will be always sweeping. The lesson may appear to be learned, only to have expected results upset by some untoward or unforeseen incident—in a word, through the loss of *morale*. Our problem to the end of real efficiency lies in securing the *control* of fire by giving the rifle itself such design as will assure the desired kind of fire. The design which prevents the loss of *morale* from making a total wreck of the fire efficiency of a command is the design we need.

It seems very certain that in the present war the artillery has handled the long ranges better than these have ever been handled before. There is, however, little to encourage the belief that infantry fire has shown equal improvement. Indeed, there is much to justify the belief that there has been no improvement in infantry fire, but that the old and immense waste of bullets caused by the old bogey, high fire, has been much in evidence.

Poorly designed piston rings ruin the work of the finest motor. A "short" lowers the force of the electric current. Those great forces, steam and electricity, were valueless until adapted and controlled by Westinghouse and Edison and their brothers in engineering. The value which attaches to suitability of design is readily apparent.

Mere perfection of design is not enough; suitability of purpose is more to the point. The fine sights on our rifle are of no more value to an excited soldier than is a transit or sextant to a hod-carrier who can better guess direction and time by the sun.

A company of infantry 150 strong with belts filled, 100 rounds per man, can with our Springfield rifle fire this all away in 10 minutes—15,000 bullets have gone hissing into space toward the enemy—but with what result? If such equals the best record known, then there would have resulted just 25 hits—an efficiency of exactly one-sixth of 1 per cent. In the face of such fire an attack can be advanced, and the assault with the bayonet made and carried home. The idea seems preposterous, but it is pitiably true. Supported by the artillery, machine guns, and grenades, still the defense has extreme difficulty in repelling a determined atack, as frequently proved by the dispatches. Often the terrain offers undulations which afford cover to the attack, but no attack can be carried out without much exposure. Why is it that such exposure fails to encompass its complete destruction? The answer is simple—the mass of fire has in every known instance gone well over the heads of the attack; *the power of the trajectory has been wasted!*

Not the force of the bullet but its *control* constitutes the real power of the rifle, just as control spells the real power of electricity and steam. The soldier, trained or untrained, under excitement and in the presence of danger, fires high. There are numerous con-

tributing causes, which we will not enumerate here. At ranges less than 700 yards the bullet from the flat-trajectoried Springfield, properly aimed, does not rise 5 feet from the ground. From muzzle to striking point this means a hit over a strip of ground 18 inches wide. Fifteen thousand bullets so directed would sweep clean the entire front of any defense, and such efficient direction of fire is attained with the battle control as easily, surely, and fully by night as by day. Flatness of trajectory, than which there is no more valuable quality in a military rifle, is now being almost wholly wasted. It becomes valuable *only* when the rifle is aimed low, so that fire from it has a sweeping effect along the entire front. With machine guns clamped in elevation a veritable sheet of fire is the result. With the battle control on the rifle, infantry fire becomes sheet fire also, and very deadly.

There are two principal methods for improving fire:

1. The training of men; and

2. The improvement of arms and ammunition.

It is certain that the improved fire of the artillery has resulted from the second method named, *i. e.*, better and heavier guns and projectiles. There has been no corresponding improvement in the infantry rifle now used in Europe; only the machine gun used by the infantry has elicited special notice or comment. Seldom do we read mention of any marked deadliness of rifle fire; generally, when the rifle is mentioned it is to comment on the deadliness or the frightfulness of its bayonet. With the nation so deeply agitated on the subject of military training, over the required time and expense; with so much manifest aversion to prolonged training, while at the same time there exists such an abundance of men and wealth, it is trifling with the national sentiment if we fail to accept the very best in infantry rifles that the factory can produce. Nor may we be excused if our judgment merely is at fault as to what is best. Only by thorough examination and test by competent boards can we protect ourselves against this danger of error.

During recent years there has been considerable interest in the automatic rifle, which wields a faster fire, requiring greater supplies of ammunition. Such rifles have met a wide use in Europe. But they yield a fire that is "sprinkling" rather than "sweeping." The clamped machine gun, played laterally, gives the true sweeping fire. Tested at Monterey in 1909 against 50 sharpshooters and experts over ranges from 600 to 2,000 yards, the machine gun won in hits made, 5 to 3. This was under peace conditions, and these favor the rifleman. Given battle conditions, and the sweeping fire gains tremendously in superiority. With the battle control on the rifle, all rifle fire becomes sweeping, and the machine guns lose their present advantage. Rather, the rifle gains the same advantage.

In the dispatches it has been noted that not a single complaint has been read by the writer over any lack of *volume* of fire; there is much complaint over the lack of efficient fire. Now, volume and accuracy constitute the sum total of effective fire, and while rapid loading and firing are easily and quickly taught the recruit, the skill requisite to aim and fire accurately is extremely elusive. Nor is such skill necessary in order to stop masses of

men—successive lines—in attack; rather it is the low, sweeping fire that carries with each bullet its ticket of death the entire route that stops the most men. With such sweeping fire over the ground in the immediate front and throughout the short ranges—the critical ranges in every hard-fought battle—the tremendous value of the flat trajectory is realized. This is not true of any military rifle now used in Europe.

The improved Springfield, which will realize even in untrained hands the full value of the danger space afforded by the flat trajectory, is an accomplished fact, and has been pronounced mechanically satisfactory by unquestionably authority. It has made good in a firing test, when used by blindfolded men, to the tune of beating the Boers over twenty-four times. When we remember that these same Boers hold the known record for efficient battle fire of 1 hit in 600 shots, or 1/6 of 1 per cent, the twenty-four times betterment, which brings its 4 per cent of hits, is a remarkable step in advance. There is no industry on earth that could live, let any twenty-four-times better product enter its particular field in competition. And there is no infantry in the world that will not be rearmed when the perfection of the new battle control becomes generally known and its value realized. It is difficult and time-consuming to teach men marksmanship; it requires practically no time to teach the average American the purpose and use of really "fool-proof" mechanical devices, be they on a rifle, on an automobile, a musical instrument, cash register, farm implement, or on any other factory product. The soldier now learns the mechanical loading, sight-setting, and firing readily. He will as easily learn the use of other desirable mechanical features of the rifle. "The spread of machinery of all kinds into all lives is making the people of the United States an essentially mechanical population — mechanical by instinct." An eminent inventor and engieer has said that he had been able to improve machinery much more easily than men. It is a fact that men make more mistakes than do machines, and this despite the fact that machines work faster and are often operated by boys or women or other unskilled operators. Our new army—*every new* army—is made up of "unskilled" soldiers. Let's demand the machines that will, nevertheless, yield the required results.

And the most skilled marksman may prove worthless in battle. Morale is absolutely essential to his efficiency, and while all military training develops this, all military authorities are also agreed as to its unstableness. The slightest untoward occurrence, false rumor, or misread signal may, and often has, upset the morale of a command in battle, just as these have been known to start a senseless run on a bank, a theater stampede, or other form of human panic.

General Cherfils, of the French Army, hit the nail square on the head when he said:

> Between the school of precision which develops "fire to kill" and the school of rapid fire which, carried to an extreme, only results in the heresy of "fire to create fear," there is a common-sense school—that of "fire to conquer." Its means are to fire well and rapidly; its object to bring down the greatest number of men in the minimum time.
>
> The school of precision, so-called, is misnamed. There is no such school to be found on the modern battlefield.

About every conceivable kind of fast-firing gun is employed to shower lead on the enemy territory, but precise aiming appears to be limited to sniping. The battle control, causing all fire to sweep the front rather than having a mere striking point—the latter usually distant from the real fight—is the sole means of insuring the "fire to conquer." In peace time the so-called school of precision occupies much prominence and commands much money and more time. When war comes it loses in prominence, for results are wanted—hits—and hits in battle, it is well known, are not gained by fine aiming at individuals. It is a valuable accomplishment for every soldier to be a fine shot, but most of the hits he makes with his rifle in battle will be at random rather than accurately aimed shots.

When the world travels in palace cars, ocean grayhounds, aeroplanes, and automobiles, would you be content with the stage coach, canal boat, or the pillion? Would you be satisfied to be identified with a school that still clings to methods whose highest efficiency, proved in actual battle, is only 1/6 of 1 per cent? If you were investing funds, would a similarly small return on your investment interest you? Are you willing that your country's victory shall rest on so narrow and precarious a margin? Are you willing that the known, understood, deplorable, and now controllable waste of rifle fire in battle by our troops shall continue rather than be employed to shoot up our enemies? Do you think your duties as an officer or as a citizen are fully discharged if you fail to raise your voice against longer continuance of the superannuated methods of fire control which now prevail; against the shameful and useless waste of bullets, which means continued low efficiency, waste of ammunition and money, and loss of the lives of our countrymen?

It would seem high time that we get right down to business and reckon only with *facts*. These *facts* are all on the side of the battle control; there is absolutely not one single *argument* that has been to date advanced against it. The writer has searched hard for such for about fifteen long years, and none has come to his knowledge. Our whole system of military defense is efficient or otherwise, according as it is suited to gain results in war. If we decide to continue the methods yielding results far below what even blindfolded men have achieved with better arms, which we fail to demand be placed in the hands of our troops, then it is high time the nation be purged of our grotesque efforts and our ridiculous pretenses, and time that it replaced slow rot with industrial intelligence. Truly "the whole of history is dotted by references to the sincere but mistaken efforts of overcautious men who sought to block the wheels of progress; men who were content to stand still and who looked askance at each step of advancement in whatever field of endeavor."

Easily over 99 5/6 per cent of all officers of the Army to whom I have shown the battle control were instantly won by its merits and expressed the hope we would soon adopt it. "Hope" alone does not win battles; we must "speak louder."

I have been asked how I would train my regiment in the use of the battle control. The complete answer can be given in few words:

I would have all men instructed to move the lever which governs the use of the battle control when ordered to do so by the fire unit commander, and *only* then. The time required would be about the same as required to teach the purpose and use of the "safety" now on the rifle.

I could then go into battle knowing absolutely that high *volume* of fire from my regiment meant high efficiency of fire as well. The battle control will increase the hits in battle easily from 20 to 50 times, and with favorable targets this advantage will increase.

Indoor Work

By Captain W. E. Simpson, 364th Infantry

THE problem of how best to employ the time when inclement weather interferes with following the regular drill schedule in the training camps, no doubt, commands the attention of many at this time. The writer wishes to explain that in this sketch he does not presume to instruct older heads in the art in which he is a novice, but merely desires to suggest some methods which he has found beneficial to a company in which he has been considerably interested for the past three months.

In the first place, rain and snow do not mean restriction to quarters. A good, stiff problem march through the mud and then dry shoes and socks will keep the men hard and prevent staleness. But there is a lot of time that must be spent in barracks which, if energetically put to proper use, is as valuable as fair weather and no mud.

Signaling can be learned by sound as well as visually if the rooms are connected by electric buzzers. The buzzers are kept busy in the evenings, and they should be loud enough so that all in the room cannot help "listening in." The following method of teaching the wig-wag alphabet by association killed off the hardest letters in fifteen minutes, and the others fell as a matter of course.

The student never forgets which is a dot after he is told that, as the Dutchman says, "Dot's right!" Imagine a row of dots, and one dash supplanting the first dot, then passing to the next, and so on down the line, we have—

— . . . B ears
. — . . L ike
. . — . F resh
. . . — V eal

And conversely—

. — — — J udge
— . — — Y our
— — . — Q ueen

Also—

— . . D ogs
. — . R un
. . — U nder

} That dash is a yellow streak.

And—

. — — W e
— . — K ill
— — . G ermans

} That dot is a drop of blood.

Inside, the manual of arms is apt to be overworked and grow stale. Keen competition between platoons is healthful, and when excellence of all makes award of decision difficult the "silent manual" is an interesting diversion, and usually proves a ready means of differentiation in judging units. If there is platoon spirit, this silent manual will be learned on the soldiers' own time, and the cadence drill conducted only when decision in contest is difficult.

The "silent manual," as used by the writer, consists of thirty-two counts and includes all the manual, done in cadence and without commands. It is better to music and then is "almost as good as a dance." The order adopted is Right Shoulder, Present, Order, Left Shoulder, Present, Order, Left Shoulder, Right Shoulder, Port, Order, Parade Rest, Attention, Rifle Salute.

The manual to music may tend to de-

stroy snap, but this is justified by the increased interest, and the men "smash those pieces" better than when the movements are executed by command.

A piano, useful in this work, can be rented cheaply, enjoyed thoroughly, and sent back when neglected and abused.

Some time, when there are two hours available, declare a field day, haul out the scrub brushes and scrub a section of the barracks. Don't try to cover too much territory, but get it white. It's a strain on blouse buttons to accept cigars from sanitary inspectors who can't find any dirt in the kitchen or dining-room, and it's no disgrace to be thought an anti-dirt maniac and scrub tyrant.

The confidential pamphlets can be put to mighty good use if classified and assigned as lecture subjects to lieutenants according to their specialties. Make it a rule that all officers attend these lectures in order to learn from each other. In assigning subjects, good use can be made of the INFANTRY JOURNAL by reference to articles. One thing certain—an officer must carefully prepare a lecture to a company of these men. Absence is better than bluff. These lectures are usually given at noncommissioned officers' school, announced ahead, and attended by most of the company. Ordinarily, a lecture lasts about 30 minutes.

Inside the barracks the noncommissioned officers can get better drill in handling the company, platoon, or squad than on the drill ground. We'll say you wish to instruct in company drill—platoon movements. Line the noncommissioned officers up and have four who most need the instruction step forward to simulate platoon commanders. You start with the imaginary company in line halted at attention, position of each platoon being designated. Beginning on the right, each noncommissioned officer in turn simulates company commander and gives one command. The platoon commanders give their commands in conformance therewith, and part of the game is to remember the position the company is in, so as not to give a command that cannot be executed, as for instance, Platoons Right by Squads, from line of platoons, or Present Arms when marching. This work can be varied by assigning problems, as "Place the compay in column of platoons facing north, with small ends of platoons on the right, Fourth Platoon leading."

Closely follow "Notes for Drill Instructors," by Colonel Nuttman, December, 1917, INFANTRY JOURNAL, in giving commands, and have attempts repeated until correct. Have commands loud enough for imagined unit to hear in wind.

In this practice the noncommissioned officer can be corrected without lessening the confidence of his men and, if it is necessary to make him precede his command with a little angry cuss in order to get enough finality and explosion in his command of execution, this can be done without in the least impairing the *morale* of his imagined troops. That practice of cuss prelude, by the way, is sometimes necessary and invariably brings out the proper inflection.

Just one more shot, and this pertaining to administration:

The noncommissioned officer in charge of quarters will make fewer mistakes and be more useful if provided with a list of duties typewritten and pasted on cardboard describing his duties *from hour to hour throughout*

the day. The following is the one used by the writer at present:

6.00 a. m. Go through quarters and check up on men not standing reveille.
6.05 a. m. The old noncommissioned officer in charge of quarters with his report and accompanied by the new noncommissioned officer in charge of quarters will report to the first sergeant.
6.45 a. m. Get the morning report at the orderly room and take it to the sergeant major's office before 8 a. m.
7.00 a. m. Supervise the policing of quarters, the latrine and the grounds around the barrack, commencing with the orderly room. See that nothing but sweepings and unburnable trash is put in can in back yard. (Tins and bottles in cans on kitchen porch.) Have toilet paper in each rack, and latrine lights out.
8.20 a. m. Get sick report at the orderly room and take the sick detail to the hospital. Do not allow them to smoke. March at attention.
11.45 a. m. Receive and distribute the mail.
4.00 p. m. Receive morning mail.
4.30 p. m. Receive and distribute the mail.
7.30 p. m. Write report, leaving space for rifle and bed check.
8.50 p. m. Count rifles and bayonets.
9.00 p. m. See that lights are out.
11.00 p. m. Inspect quarters, reporting absentees at 11.00 p. m., and such other hours during the night as may be designated by the company commander.

Once an hour, during the day, between the hours of 6.00 a. m. and 9.00 p. m., visit the different squad rooms, the latrines, and other parts to see that everything is in proper order.

In case of fire call, place two men on roof if fire is near, have lights out and turn off all water.

Attend all formations in quarters that do not conflict with above duties.

On the other side of the board is pasted a form to be followed in making his report, one of the subdivisions of which is *"Suggestions."* Many of the suggestions proposed by the noncommissioned officer in charge of quarters have been adopted and proven very useful.

Necessity for the Reorganization of the Machine-Gun Service

By Major R. F. Migdalski, Q. M. Corps, N. A.

DURING the three years of warfare in which all weapons from the dagger to the monster 42-centimeter howitzer have played their part, the machine gun has continued to lead in importance as a weapon of defense as well as offense. But little known prior to 1904, this weapon came into more or less general use during the Russo-Japanese War. It was during this war that German military observers on the Russian as well as the Japanese side, discovered the effectiveness of this most deadly of all modern weapons. It was the result of the reports made of these observations that caused the German General Staff to change the drill regulations of the German army. In this the machine guns were not forgotten. Great prominence was given these weapons, and many experiments were conducted under varying conditions of service.

When war broke out in 1914, the German machine-gun organization was superior to that of the Allies; besides, they had more guns per thousand men, and the personnel of these units was made up of men trained in that branch of the service. The Germans continued to increase the number of their machine guns in the trenches until their front was practically a solid line of machine guns capable of stopping any and all attacks not sufficiently prepared by artillery.

Various types of machine guns are used by the nations at war. They can be classified into two general classes: the light and the heavy types. The light type of gun accompanies the infantry in the attack, and is also used in the defense of front line and support trenches, while the heavier guns are held in reserve, the emplacements for these being of a more or less permanent type. Owing to the ever-increasing demand for machine guns in the trenches, it was impossible to expand the then existing organizations and to furnish the necessary trained men for the new units. So additional guns had to be issued to the infantry and dismounted cavalry in the front line and support trenches, and for a while these troops had to make the best use of this weapon they could under the circumstances, considering the fact that the trained personnel was not available for manning the guns. This condition of affairs was soon remedied, as trained men continued to be sent to the front from the several machine-gun schools established in England and France. These trained machine gunners continued to be members of the infantry or cavalry to which they were assigned.

It is my opinion that a machine gunner is neither an infantryman nor a cavalryman, and that he is in a class of his own. We all agree that he is not an artilleryman. What distinguishes him from soldiers of other branches of the service? In the first place, his training is different, inasmuch as his principal weapon is the machine gun. In the second place, the character of his principal weapon, the machine gun, requires the services of an expert and specialist. The machine gun is a gas engine which requires an expert for its proper handling. Anyone can pull the trigger of a machine gun and fire a string of shots, but not everybody can

put the same gun into operation when something goes wrong with its machinery. The machine gun is an engine, and hence requires the services of an engineer to operate it properly.

The infantry, as well as the cavalry, have about all they can do to learn the duties of their respective branches without this additional work, which by right belongs to another and distinct branch of the service, and which I shall call the Machine Gun Corps.

Superficial critics will say: "Specialists do handle the machine-gun companies, and machine-gun troops are parts of each regiment of infantry and cavalry." This is true. Prior to 1916 the men belonging to machine-gun organizations were detailed from companies in the regiment. In some regiments the machine-gun commander was permitted to select his men, in others they were detailed by the regimental commander upon recommendations of the company commanders. In the latter case, most of the men so detailed were not wanted in the company for some reason or other, and hence were transferred to the machine-gun company. The commander of such machine-gun company had much to contend with. His noncommissioned officers had to be selected from among these men who, in many cases, were not fit to be privates. As regards the commissioned personnel of machine-gun units, the selection should always be made for efficiency and on account of particular aptitude for this line of work.

In many cases the machine-gun commander received but very little support or encouragement. This was a new weapon, very little was known of it, and the whole matter of efficiency of the organization depended entirely upon the energy of its commander. Since the reorganization of the army in 1916, the machine-gun companies have changed from the provisional to the permanent status.

If the machine-gun companies constitute a distinct branch of the service, why are they not organized into battalions, regiments and brigades? The usual answer is this: "Because they are required to support cavalry and infantry, in attack as well as in defense." But so is artillery required to do this. Why not reorganize the artillery and attach or assign a battery to each regiment of cavalry and infantry?

Every student of military history knows how inefficient artillery was prior to its organization into regiments and brigades. Prior to Napoleon's time a number of cannon was assigned to each regiment of infantry. This artillery never did develop into the important branch of the service it is now until it was organized into battalions and regiments. Our machine-gun service is now in the relatively same state of efficiency that the artillery was in prior to its reorganization into battalions, regiments, and brigades. Until recently, it very seldom happened that more than one machine-gun company was stationed at any one post or camp. In order to make the machine-gun service efficient there must be uniformity of instruction, and this is impossible under our present organization, as uniformity of instruction demands one controlling head. This can only be attained through organization into regiments, brigades, and corps.

In a regimental organization an interchange of ideas is possible; under our present system it is out of the question, and unless an interchange of ideas and methods does take place real progress cannot and will not be made.

Ruses and Snares of the Enemy When Retreating

Precautions Necessary to Avoid Traps

DURING their retreat between Artois and the Aisne, the Germans used a great many snares and traps to hinder the advance of the pursuers and to inflict losses on them.

The following are the most typical examples:

In the Shelters.—A long, flexible branch is placed across the entrance to a shelter as though for camouflage, and must be removed before a visitor can enter, but a wire attached to the branch connects with a primed charge, hidden in the shelter, which explodes a few minutes later. A book is laid on a table; a wire along the leg of the table is attached to a charge which explodes when one picks up the book. Piles of abandoned coal conceal detonators. A charge of explosives is hidden in a stove pipe and connected by a fuze to the fuel, which is all laid; when the fire is lighted all blows up. A sandbag blocks the entrance to a shelter; when removed a charge of a dozen grenades with support rods explodes near by (conductor). A nail, partly driven into a step, connects with the cartridge cap on a charge; when one steps on the nail the cap explodes. Access to a shack is connected to a charge by an invisible wire. Telephone wires, extending along the bottom of a shelter, apparently join it with an ordinary gallery, but really connect with a mine which, when the wires are touched, destroys the shelter. Moving a shovel thrust into the wall of a shelter or wedged between two logs explodes a mine. By separating the branches which conceal a shelter, opening a door or pulling out the ashpan from a stove, a charge or petard detonates. Various objects—tools, pieces of metal, shell fragments, helmets, escutcheon, artificial flowers, and "souvenirs" of all kinds—left scattered around may cause mortal accidents, as they are connected with primed charges. A stove pipe seemingly awry may set off a mine when one tries to replace it. Sometimes an old chair performs the same function. A window weight is suspended by a string across the entrance of a shelter. When one enters, the string breaks and the weight falls into a box of detonators which fire explosives. The step of a staircase is put in contact with a nail which touches the primer of a mine. Timber casings, the studs of which have been sawed and replaced by hard wood corners, conceal the work necessary to set the mine for blowing up the shelter.

In the Trenches.—Buried hand grenades are connected by telephone wire and explode when the wire is touched. The new or repaired flooring of firing steps conceals a stem grenade which detonates when stepped on. Wire of a fence may also be in contact with grenades. Other primed grenades are scattered on the ground or in underbrush. Garments or pieces of equipment are connected with petards.

Along Roads.—An open gallery on the lower side of the road leads to an uncased mine chamber with only a very thin roof. A primed 150- or 200-mm. shell held up by a support is so placed that the armed fuze head almost touches the roof of the gallery. The depres-

sion caused by passing vehicles results in detonation. A fougasse is concealed under an undermined road which, though capable of supporting the weight of men, gives way under loaded convoys. Sometimes a chest of explosives, buried a few centimeters under the surface, is used for the same purpose.

In Wire Entanglements.—Net works of wire, cleverly covered by branches, are very hard to see, hinder the advance, and permit setting traps.

Dwellings.—An undamaged house, surrounded by others that have been destroyed, is especially dangerous. Time explosives are often prepared in it. The town hall at Bapaume blew up after it had already been occupied for several days by the British troops. The Sapignies church blew up also a few days after the village had been evacuated by the enemy. Other similar explosions took place in various places, noticeably in an underground chamber in Bapaume. An aviation officer, made prisoner, stated that similar mines had also been placed in front of the Hindenburg line. These are regulated by clock-work timing explosions at different periods. Bickford fuzes, set in fireplace, detonate when lit. Small mines are frequently found under loose boards and floors, in ceilings or wainscoting. Other mines are laid in wells. These are indicated by the Germans by white signboards marked with red circles having a disk of the same color in the center. The explosive charge is usually placed about 4 meters from the wall of the well and at a depth of 4 meters. Wells were contaminated.

Stables.—Grenades are sometimes placed on the ground hidden by a brick or a tile covered by straw or hay. The slightest pressure causes their explosion. Forage, oats, or straw should be looked upon with distrust. A German agent, arrested in the armies zone, carried matter which he admitted was impregnated with bouillon culture intended to spread an epidemic of glanders. (A wooden box held the metal tube containing the bouillon culture.)

Poisoned Food.—The order of the II German army, dated 26/3/17, would seem to indicate that the enemy may leave poisoned food behind him: "Two cases of arsenic poisoning, causing the death of soldiers, occurred because the *white powder* which was wrapped in a piece of paper was mistaken for flour. *Troops are warned not to touch those provisions which may be left behind in small paper bags. . . .*"

PRECAUTIONARY MEASURES

As it takes some time to prepare these traps, some of which, as at Roye and Noyon, were laid in the fall of 1916, *one must expect to find traps more especially in those localities where the enemy has voluntarily retreated,* rather than in the places from which he was disloged by an attack or rapid advance.

Until specialists have had a chance to investigate one must be very suspicious of the following: Shelters which are excessively well furnished or luxurious; shelters dug under roads or near paths; houses that seem miraculously to be left standing among ruins; all new works, recently constructed trenches; parts of equipment still in good condition left with others which have been worn; freshly turned soil; metal scraps; woodwork of shelters and framework of galleries which do not look decayed; the favorite "souvenirs" of soldiers, such as rifles, bayonets, empty cartridge shells, projectiles, shields, helmets, left clearly in evidence as though purposely on the spot where

found; frames moved from their regular places; articles stuck in the ground or walls, arms, shovels, grenades; suspicious objects, utensils scattered around trenches, shelters or saps; even the flooring of the firing steps which look lately repaired; new ballasting and refinished floors.

Even entrances to shelters which have been destroyed by an explosion are not wholly safe, for mines may be concealed in the undamaged parts, behind the wreckage or in other intact entrances.

Stabling for horses should be thoroughly disinfected and only used cautiously after burning all the bedding, straw and oats left behind.

The following sign: "Use of this water is forbidden," must be placed above all sources of water supply, until it has been analyzed by technical experts who guarantee it perfectly harmless. The expert designated will later state whether the water is "drinkable" or "dangerous."

The men charged with clearing out wells which have fallen in must be carefully equipped with safety ropes and gas masks so as to escape deleterious gas which might remain from the explosion and to climb out quickly in case of danger.

Listening tests will be made in buildings, galleries and subterranean chambers to make sure that there are no clock-work driven infernal machines.

Roads should be made the subject of painstaking inspection in order to detect mine galleries or fougasses prepared in view of their destruction.

METHODS USED FOR FIRING

The traps work automatically or electrically, sometimes with a clock-work fuze, or through a "silent" mechanism with a spring attachment which silently and slowly extends. The mechanism may be released by walking over or leaning against an object; a board presses on a safety pin, which releases the spring of an igniter or primer firing pin, causing it to strike a detonator. The electrical arrangement is operated by pulling on a wire or by making contact by walking over an object. The "silent" mechanism is an automatic detonator containing an acid which releases a spring by eating through it. One should therefore cut all suspicious looking threads, being careful not to sever those stretched tightly or taut ropes which may be found among slack telephone wires, for they may support weights which, once released, fall and strike detonators. When cutting wires, one must take pains not to pull them, but simply to separate the two ends which should be marked, when numerous, with the same sign, so as to permit the technicians to identify them when they search for explosive charges, which must be removed to avoid accidents.

NEW DEVICES

According to information from prisoners it appears that the Germans, in addition to the traps and ambushes above mentioned, have made preparations on a large scale for mining the trenches and shelters which they contemplate evacuating. The mines will explode when we have occupied the trenches and shelters. Therefore it is necessary, during the advance, to forbid the use of enemy trenches and shelters until it has been ascertained that they are not dangerous and hide no trap. The first lines especially must not occupy enemy trenches but should go beyond and build new trenches, in order to avoid all danger from explosions of mines laid by the enemy.

Battlefield Illumination[1]

An Example of Practice in Battlefield Illumination in America

By Captain R. R. Kuldell, *Corps of Engineers*

BATTLEFIELD illumination has now become a responsibility of all line officers, as well as of certain staff department officers. All officers of the division commanding organizations will therefore give this subject study, and will cause their organization to be trained therein.

This subject may logically be divided into the subheads:

(*A*) Battlefield Illumination with Searchlights (a function of engineers).

(*B*) Battlefield Illumination with Trench Lights (a function of all branches of the service).

(*C*) Battlefield Illumination with Rockets, Star Shells, Illuminating Grenades, Flares, etc. (a function of all branches of the service).

(A) Battlefield Illumination with Searchlights

Tactical use:

(*a*) To discover and keep in touch with the movements of the enemy during the night.

(*b*) To seek out and illuminate hostile objective, so as to fire upon them.

(*c*) To blind the enemy.

(*d*) To illuminate roads and possible hostile positions in the more distant foreground by periodically working the light.

(*e*) To search the near foreground.

(*f*) To support fire effect by steady illumination of hostile targets.

(*g*) To secure obstacles against hostile attempts at illumination.

(*h*) To disturb hostile works by alternate blinding and turning on the beam or by working the beam back and forth.

(*i*) To blind opposing searchlights.

(*j*) To support attacks in the foreground by throwing the beam in front of the advancing troops and screening their movements.

(*k*) To blind the enemy and disturb his forward march and firing capacity, and confusing him by making him think his plans are discovered.

(*l*) To facilitate the landing of aviators at night.

(*m*) For anti-aircraft work.

(*n*) To give agreed upon signal, such as assembly points, or to indicate a threatened flank.

(*o*) To contribute to the rest of the men by diminishing the chance of surprise.

It is more difficult judiciously to employ searchlights in an attack than in defense, for while the defender will deavor to explore and minutely search all the terrain in front of him, the assailant will seek obscurity to execute his movements and obtain surprise effects.

Searchlights on the Defensive

In order to obtain sufficient illumination in each zone of terrain to be illuminated, it is calculated that there should

[1]Reprinted by permission from "Professional Memoirs," Corps of Engineers, U. S. Army, November–December, 1917.

be one light for each 1,000 yards of front.

The lights should be arranged in groups of three lights, one 36-inch light and two 24-inch lights arranged thus:

1 Division

o 24″ 1000 yds. O 36″ 1000 yds. o 24″

1st Group

1000 yds. O 36″ 1000 yds. o 24″

o 24″ (Reserve)

2d Group

This arrangement permits the use of the 36-inch lights for searching and the 24-inch lights for illuminating the target after it has been located by the 36-inch light. The 36-inch lights continue searching after turning over the target to the 24-inch lights. Searchlights work intermittently, the beam being exposed not more than 20 seconds at a time; this is to prevent ranging of artillery or rifle fire. The six lights for a division are attached to the divisional engineer train and commanded by the commander of the train. When in operation, as shown above, the train commander commands one group and his senior lieutenant the other. In prepared positions the searchlights are accurately and scientifically located by the division commander, aided by his chief engineer.

The division commander keeps the searchlight commander informed of the situation, objective, his own intentions, and those of regimental commanders in the vicinity. This information must be given in good time in order to allow group commanders to define exact duties to the observers and operators.

For any sector of the defense there must be telephone communication between the group commander and his observers and operators, and between the group commander and the commander of the sector of defense.

When used for artillery fire the battery commander selects the most favorable position for observing the fire of his battery and for commanding the battery. The most favorable position for observing is about 50 yards to one side of the searchlight and slightly in rear of it. As soon as the target is discovered the battery commander has the fire prepared for the target. The light remains masked as much as possible. It unmasks immediately after the salvo is fired for the time necessary for observing the fire.

In connection with rifle and machine-gun fire the searchlight is particularly useful. There must be complete communication between the infantry commander and the commander of the searchlight groups.

Searchlights on the Offensive

In this case searchlights have fewer opportunities, as the attacker endeavors rather to take advantage of the darkness to surprise the defender's position which he has reconnoitered or attacked unsuccessfully during the daytime.

Nevertheless, searchlights can be used in case of a check in the attack, due to heavy losses or other cause. The attacker's searchlights are then used as follows:

1. They allow the attacker's artillery

to fire against the defender's positions.

2. They light up the defense and disturb the defender's proceedings.

3. They counteract the defender's searchlights by blinding his electricians with their own rays.

4. They neutralize the defender's searchlight beams.

5. They establish a zone of light in front of the attacker's columns, lighting up the line of advance to his own troops and hiding it from the defense; this screen should be mobile and directed so as to deceive the enemy as to the direction of the advance.

6. They help by revealing obstacles to their own artillery which is thus enabled to destroy them.

7. They light up the whole defensive position when about to assault.

8. Just before the assault they discover the enemy reserves just behind his firing lines.

9. They cover the retreat of an unsuccessful attack.

Training in the Use of Searchlights

The care and operation of searchlights is a highly technical duty, and requires the long-continued, systematic training of specially selected officers and men. For the care and operation of the carrying trucks, the gasoline engines, the electric generators and the lights themselves, electrical and mechanical engineers are required who thoroughly understand the theory and practice of the operation and repair of their units. For group commanders and observers, officers are required with experience gained only by constant practice in the selection of sites, and the operation of the lights over varied ground and under different atmospheric conditions.

The first step in training, therefore, consists in organizing a divisional engineer train for each infantry division and each cavalry division of specially selected engineer officers and men, and assigning to each train two 36-inch searchlight sets and four 24-inch searchlight sets. The course of training for the train should be arranged by the train commander and be conducted continuously and systematically without the interference of other duties.

The second step in searchlight training consists in the use of lights with the infantry and artillery, separately at first, and in combination later. Such training requires the use of extensive maneuver grounds where actual firing can take place.

(B) BATTLEFIELD ILLUMINATION WITH TRENCH LIGHTS

The engineer department has recently purchased a number of incandescent trench lights to be used on poles, and some storage batteries.

	Pounds.
Weight of light....	24
Weight of pole....	6
Weight of battery..	85½

In addition a number of gas-electric generating outfits, to charge the storage batteries, have been purchased.

The trench lights, batteries and generating outfit will be maintained with the engineer train. The batteries will be cared for, charged, and batteries and lights distributed to the infantry by the engineer train. A battery will supply one light with current for five hours continuous burning. In trench work the lights will be used only intermittently, so that one battery can probably be used two nights before recharging.

The distribution of trench lights is, at present, 24 lights for each division.

One light will give sufficient illumination to permit rifle fire 200 yards in front of it. The beam is not a cylinder, as is the case with the searchlight, but a cone with an angle of dispersion of 30 degrees.

In action the lights are turned over to the infantry during the afternoon or evening with batteries charged. They will be located, if possible, in front of the fire trench. The operator is well protected, being entirely below the parapet. The light is on an 8-foot pole. The operator receives instruction from the defense commander. He observes through a loophole or periscope.

The primary use of the trench light is for defensive work to illuminate the foreground in order to detect enemy patrols cutting the entanglements, or to fire on the enemy in case of a general assault.

The trench light has many other uses, such as:

(*a*) Illuminating the site for the construction of a bridge, machine-gun or battery emplacement or any other night construction work.

(*b*) Illuminating the enemy side of a bridge or ford to assist in the protection of it.

(*c*) Furnishing light for loading or unloading men, animals, or material at night.

(*d*) The same batteries, with smaller lights, can be used for the general illumination of the communicating trenches, latrines, command posts, etc.

The location of the lights in a trench or a defensive position is of the utmost importance. Improperly located, they serve to define exactly to the enemy the trace and flanks of the line they are to serve. If allowed to shine too long, they furnish excellent aiming points for the enemy's fire.

When properly placed, they refuse to the enemy those undulations of the ground which otherwise would permit him to advance his attack, unheard and unseen, to within a few yards of the first trench. By scientific location and operation, the lights can often be used to deceive the enemy as to the exact location and extent of the position.

Training

As the lights are to be *used by the infantry,* each battalion should be given opportunity to train a squad of men in the handling of the light. This training will consist of learning—

(*a*) The parts of the light, its care, and adjustment.

(*b*) The use of the battery, its care, and method of attaching wires.

(*c*) Handling the light so as to obtain illumination on the desired object in the open through loophole, through periscope.

(*d*) Operation by telephone from the infantry commander.

The officers will need training in selection of positions for the lights and in obtaining coordination between adjacent lights. They will be practiced in locating lights and operating them by telephone, buzzer, flash signals, or messenger.

In all actual use of the light at night in problems where no ball ammunition is used, officers or noncommissioned officers should be in the assumed hostile positions, both to serve as targets and as observers and critics of the use of the lights.

(c) BATTLEFIELD ILLUMINATION WITH ROCKETS, STAR SHELLS, ILLUMINATING GRENADES, AND BOMBS

All these methods of illumination are propelled from a rifle or mortar high into the air, where they ignite and burn

with a brilliant light for 10 to 30 seconds.

The illuminating rifle grenades are no longer in the experimental stage. They are now ready for issue to troops. Each regiment will eventually be given a supply and an annual allowance for use in training.

The advantages of this method of illumination are:

(*a*) The light comes from high in the air, similar to daylight; hence no long shadows. It illuminates the foreground to a distance of 500 yards.

(*b*) With favorable wind or no wind, the light can be placed over the desired object without revealing the location of the operator.

(*c*) It requires no special technical troop and no expensive equipment.

(*d*) It is low in cost.

The disadvantages are:

(*a*) With a reverse wind, the light may be carried back over the defenders' trench and serve the enemy.

(*b*) To overcome this, the time of burning must be limited to 10 seconds and more rockets used.

(*c*) The range as a projectile is limited to 200 yards in favorable wind.

In addition to their use for battlefield illumination, colored rockets are used extensively for signaling between infantry and artillery.

Training

Training in the use of this method of battlefield illumination must be similar to that outlined for trench lights. The training combines naturally with all night problems.

Each company should have selected men trained in the use of the rifle illuminating grenades. These men will carry the grenades into action, and they will be placed by the company commander and fire their grenades under his orders. The remainder of the company must be trained to quickly pick up and fire at the target when it is illuminated by the light of the grenade. Proper training will effect economy and obtain maximum effects from each grenade fired.

Flares

A flare is usually a paper cylinder containing a combustible, such as nitrate of potash, sulphur and orpiment, or magnesium ribbon, which burns about one minute with a brilliant flame. The flare is wrapped in wax paper. It is about 14 inches long, 1 inch diameter. At one end is a tin-foil cap covering a tape.

Directions for lighting are printed on the flare. Another method is as follows: Tear the paper away from the heavy end of the flare. Place one end of a piece of time-fuse against the end of the flare and pour the powder from a rifle cartridge over these two ends. Wrap with tape or bandage.

They are used for illumination and signaling.

In Defense

For illumination they are most often used in a pit attached to a trip-wire, so that the enemy in advancing toward the entanglement falls over the trip-wire which operates the flare.

The flare may be lighted by a wire operated in the trench.

Flares take the place of the kerosene torches and bonfires that were formerly employed to illuminate the entanglements.

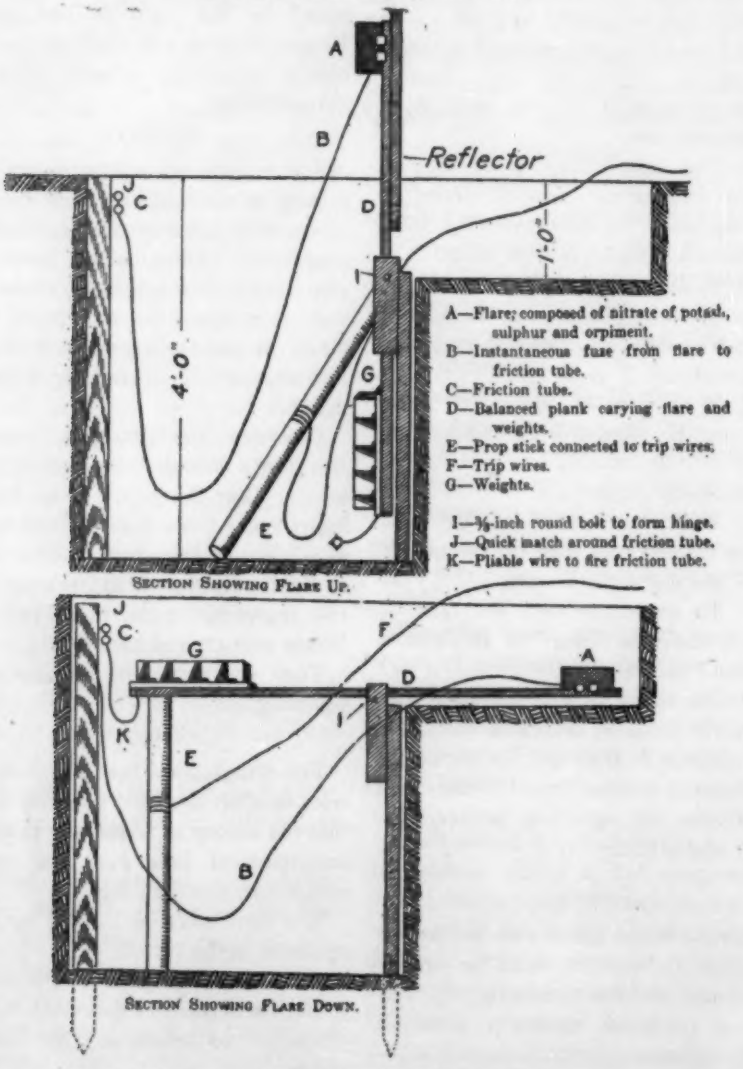
On Offensive

Sometimes when the contact aeroplane observer sounds his horn or other-

wise signals to the infantry to disclose the line of advance which they have reached a flare is lighted. The observer can then signal the artillery to raise or lower the barrage, as may appear necessary.

The importance of this method of communication used day or night and with or without the time schedule, cannot be overestimated. The success of the assault depends upon the infantry keeping so close to the barrage that the enemy will not have time to man his trenches from the dugouts and cave

AUTOMATIC FLARE LIGHT AND PIT.



SECTION SHOWING FLARE UP.

SECTION SHOWING FLARE DOWN.

shelters, after the barrage has lifted and before the attacking infantry reaches the trench. If the infantry fails to disclose its position to the aeroplane observer when called upon to do so, the barrage will either not move forward with the infantry or will move too far ahead of it, causing more casualties in the attack which follows than could possibly have been caused by the enemy discovering the position of the infantry.

Men lighting flares place them in the bottoms of shell holes or other depressions when possible.

Training

A line of pits should be arranged just in rear of the entanglement with the trip-wire in front of the entanglement.

If time does not permit the use of the pit, the flare with its reflector can be fastened to a stick 4 to 5 feet above the ground with the igniting cap at the base of the stick. A heavy stone trap can be used to give the necessary pull.

One point to be brought out in the training contemplated is the efficiency of the engineers in delivering to the infantry the trench lights and flares in good time and in working order.

The allowances above given are made from recommendation of observers in the European War and may be modified as a result of the training contemplated.

Problems in Battlefield Illumination

By Captain W. S. Drysdale, *Eighth Infantry*

TRAINING OF INFANTRY TO FIRE AT NIGHT AIDED BY ILLUMINATION

Problem for Infantry

1. Using indirect fire—

(*a*) Determination of probable effect of infantry fire at night. Sights and auxiliary target lighted.

(*b*) Determination of suitable auxiliary target.

(*c*) Report on other data of interest such as rate of fire, fire units, control of fire at night, necessity for lighting sights, etc.

2. Using direct fire—Same as above, omitting (*b*).

3. Suitability of infantry fire for attack at night, foreground lighted.

Problem for Engineers

1. Determination of most suitable position for searchlight units to light the signals, auxiliary target and foreground for infantry.

2. Suitability of flares, searchlights, or other devices for the purpose of furnishing the necessary illumination for accurate firing of infantry at night.

3. The proper protection for the lights from hostile fire.

4. Suitability of lights for aiding the infantry to attack at night with fire.

The problem was tested at night with one company, aided by illuminating bombs furnished from the engineer train.

Indirect fire was used.

The problem was one in which the hostile firing line (represented by 64 kneeling figures) was almost entirely hidden from view in the underbrush, and consequently furnished a very unsatisfactory target. It was 350 yards

distance across the valley of the rifle range.

An auxiliary target (a small bush), midway between the firing line and targets, was used, and a sight setting (readily determined from the new issue field glass) was used that brought the sheaf of fire into the target.

The auxiliary target being midway between the target and the firing line, the dispersion at the target was exactly equal to the front of the company firing, and, although the target was practically invisible, about 70 per cent of the figures were hit, firing five rounds per man, firing clip fire.

It is thought the above method would be suitable in a carefully prepared defensive position, and the use of an auxiliary target which is unmistakable and distinct will result in more target hits than firing at the target itself, particularly when that target is indistinct, as would most frequently be the case in combat firing, particularly at night.

Interesting and valuable data may be compiled from tests of night firing conducted by different organizations at night that may result in a method of training for night firing that would increase the efficiency of infantry fire at night.

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New Defensive Tactics[1]

1. The following terms are laid down, and will be strictly adhered to in connection with the new defensive tactics —

(*a*) *Outpost line of the forward zone* (*Sicherungslinie der Vorfeldzone*) to indicate our own front line in the forward zone.

(*b*) *Line of resistance of the forward zone* (*Widerstandslinie der Vorfeldzone*) to indicate that line to which the infantry in the forward zone will retire in the first instance, in the garrison of which it will be incorporated, and in which it will offer resistance.

(*c*) *Main line of resistance* (*Hauptwiderstandslinie*) to indicate the line where the decisive encounter will take place.

In order to avoid misunderstandings and confusion, no other terms will be used.

2. The forward zone in front of the main line of resistance will be held as lightly as possible. The strength of the garrison will depend on the ground and the locality. Generally speaking, the main bodies of the companies of the battalion in front line will be posted in the main line of resistance, and only small detachments (a group per company with 1 machine gun, or 2 or 3 platoons taken from 1 company) will be moved into the forward zone for the purpose of repelling large hostile patrols. With this object, it is advisable to hold the weakly garrisoned forward zone as a zone of defense organized in depth, with the troops distributed chequerwise, and not to hold only the front line by a series of posts forming a single line which can be quickly penetrated.

The action of this garrison of the forward zone will vary. Generally speaking, it will resist and delay the enemy, that is, it will only retire when forced to by the enemy, or on receipt of a definite order as to the origin of which the commander is satisfied. The establishment of hostile posts in our forward zone must be absolutely prevented.

3. On receipt of the code word *Grosskampf am* 10.*x* 6 *vorm.* (large attack on 10/10 at 6.0 a.m.), which will be sent out by Group Headquarters as early as possible on the previous evening, if an attack on a large scale is anticipated, *the front line of the forward zone* will be withdrawn according to plan about 500 meters (beginning at the above-mentioned hour) into the "*line of resistance of the forward zone*," in which a few light machine guns and *Granatwerfer* will have been previously dug in. This "line of resistance of the forward zone" must be permanently marked out on the ground by means of pegs, trip-wire, posts, sticks painted with luminous paint, flags, etc.

At those points where the present front line of the forward zone is less than 500 meters from the main line of resistance, it is best for the outposts to fall back on the main line of resistance. When there is no forward zone, the disposition of the garrison will remain unaltered.

4. The distance of 500 meters appears to correspond with British orders for

[1] Translation of a German Document of November 11, 1917.

the position of their barrage. The British first put a protective barrage on to the area to be attacked, consisting of a wave of fire 540 meters in depth, measured from the front line of our forward zone. This barrage then advances. It is heaviest in the vicinity of the front line of our forward zone, where it consists of artillery, machine gun and rifle fire. At a distance of 500–600 meters from the front line of our forward zone it is considerably less intense.

5. As a natural consequence, our artillery defense will be organized as follows:

Shortly after the zero fixed for the attack on a large scale, our barrage fire and annihilating fire, which have hitherto covered predetermined areas in front of our foremost outpost line, must now be put down farther back *on* this outpost line. The time allowed for the completion of the infantry movement will be fixed at 15 minutes.

The moment the British barrage commences, our counter-barrage must be put down at once with every battery of every caliber, with the exception of the heavy flat-trajectory guns, in order to catch the British before they can follow up their own barrage. The batteries of the flanking groups, if they cannot switch their fire with direct observation, will continue to fire on their allotted areas until they receive orders to change the direction of their fire.

Our batteries will not register our original front line, but will each work out the correction required for shortening range 15 minutes after zero.

6. Should the expected attack in force not take place, the order "Old line X/10 7.30 p.m." will be given as early as possible on X day; in which case, *without further orders* the advanced posts will, commencing at 7.30 p.m., push forward again into *the front line of our forward zone*. This operation will be commenced *from the line of resistance of the forward zone* at 7.30 p.m. *After* 7.30 p.m., the barrage areas will be those previously registered in advance of the old front line of our forward zone.

7. Contact must be maintained without fail with units on the flanks, especially at divisional boundaries. Every commander is responsible for maintaining constant touch with the units on his flank.

8. Every opportunity for counter-attack must be seized, whether it be made in front of the *main line of resistance* or in front of the line of resistance of the forward zone, as, for example, pursuit of the enemy who has been repulsed or compelled to retire. Experience has shown that these counter-attacks yield booty and secure our hold on our forward zone.

9. (*a*) Should the enemy attack before the code word "*Grosskampf*" has been given, our counter-barrage will be put down in front of the foremost outpost line of the forward zone. The outposts on the line of the attack, as soon as it is certain that an attack is taking place, will retire in order to the "line of resistance of the forward zone," and will be absorbed into its garrison. There they will make a stand, retiring on to the main line of resistance, either under pressure from the enemy or on receipt of an order.

Once it has been definitely ascertained that this movement has been completed, the company commander in the main line of resistance will send up a white flare, breaking into small stars. This signal will be repeated to the rear. The artillery will then immediately shorten range so as to place its barrage close in front of the main line of resistance.

(*b*) The same tactics will be resorted to when "*Grosskampf*" has been signalled, but the enemy attacks *before* the zero given, *i. e.*, before the infantry has commenced to retire to the line of resistance of the forward zone. They will equally apply in the event of an attack subsequent to the re-occupation of an outpost line in the evening, which had been evacuated in the morning as the result of a "*Grosskampf*" signal.

(*c*) Should the enemy attack while the movements resulting from a "*Grosskampf*" signal are in progress (for example between 6 and 6.15 a.m., when "*Grosskampf*" has been given for 6 a.m.), the artillery will at first put down a counter-barrage in front of the original outpost line of the forward zone. The outposts will continue their methodical retirement from the outpost line to the line of resistance of the forward zone, and will be absorbed into the garrison of the latter. *At* 6.15 *a.m.*, as pre-arranged, the barrage will jump back to our original outpost line. The infantry will make a stand in the line of resistance of the forward zone, retiring to the main line of resistance under pressure from the enemy or on receipt of an order. Subsequent action will be regulated in accordance with the second sub-para. of para. 9 (*a*).

(*d*) *Those portions* of the outpost line of the forward zone *which are not attacked* will hold their ground and cover their exposed flank by throwing it back. They can be further stiffened by pushing up weak supports from the line of resistance of the forward zone. They will only retire to the latter when forced to do so by threat of envelopment. The line of resistance of the forward zone will then be held according to plan.

10. The signal "Lift your fire" means that the *artillery* is to increase its range by 100 meters. The reason for the signal may be either that our artillery is firing short, *i. e.*, shelling our own infantry, or that an attack which has been repulsed is to be followed by artillery fire as it retires.

Every time the signal is repeated, the artillery will again increase its range by 100 meters. Attempts must be made and all means should be employed to ascertain exactly where the flare signals are being sent up, in order to prevent our barrage being withdrawn from the front of our main line of resistance when it is still needed by our infantry. It must be borne in mind that the British, in order to induce us to lift our fire from points where it is particularly accurate, often imitate our flare signal "Lift your fire." The range will, therefore, only be increased in response to flare signals if the sector in which the flare signals are being given can be established with some degree of certainty. The same applies to the signal for "Shorten range," which must only be given by the company commander or some senior officer.

Flare signals for "Lift your fire" will not apply to barrage and destructive fire on the areas in front of the foremost line of our defensive zone which have been registered with direct observation.

The cooperation of the artillery survey sections is of the greatest value in fixing the point at which the flare signals are being sent up, as they can determine the exact point where the signal was given by means of intersection of the flares. They will report the result of the intersection as quickly as possible to the artillery commanders, who will transmit it by the quickest means available to the batteries concerned which are firing in this sector.

11. The white flare signal for "shorten range" will be given from the main line of resistance (by a company commander or senior officer), if it is seen that the troops stationed in the line of resistance of the forward zone are retiring from it.

Flare signals for "Shorten range" should only be provided for the main line of resistance. This flare signal should not be issued to the forward zone, in order to prevent it being used at the wrong time.

12. The main point in all alterations in the range of the artillery fire is direct observation of the battlefield, which provides the most certain means of obtaining a clear idea of the situation and of deciding as to the targets to be fired at. Emphasis must once more be laid on the fact that an artillery liaison officer must be attached to every commander of the troops in line, and must be amply provided with telephone wire, with his own runners down from the artillery, and with all other means of communication (wireless, carrier pigeons, etc.). It is essential that every battery and every sub-group be supplied with a close-observation post.

13. Balloons and airmen should be provided with flare signals for barrage fire, annihilating fire and "Shorten range." On days of very heavy fighting, they must pay particular attention to observing where these signals are being given in our front line, and will call the attention of the artillery to the signals which are being sent up by the front line by repeating them. Balloons must also endeavor, by means of lines of direction laid far in advance of the balloon beds, to establish the points at which the individual flare signals are being sent up, and the information derived from their observation in this way must be transmitted to the artillery command posts, with which they are connected by telephone. It is the duty of airmen, as soon as they have established the points at which the flare signals are being sent up, to transmit by wireless the meaning of the flare signals and the points from which they are being sent up.

14. These tactics of altering range aim at simplification and at preventing the enemy from passing through our barrage fire, as well as enabling us to withdraw our infantry without its coming under our own fire.

15. Regiments will practice these tactics immediately, and explain their object to the men. In these operations, emphasis must again and again be laid on the fact that the British infantryman is in no sense the equal of our infantry, as soon as our infantry gets to grips with him in a counter-attack.

(*Sd.*) BRAUCHITSCH.

GENERAL STAFF (INTELLIGENCE),
ADVANCED GENERAL HEADQUARTERS.
14*th November*, 1917.

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Divisonal Orders for the Relief of the 56th Division by the 5th Bavarian Division[1]

No. I/37. Divl. H.Q.,
5th Bavarian Infantry Division. 6-9-16.

1. **The 5th Bavarian Division** will relieve the 56th Division, and will form part of Kirchbach's Group (Corps H.Q. at Metz-en-Couture).

On the right of the Division is the 4th Bavarian Division (Divisional H.Q. at Barastre).

On the left of the Division, the 111th Division will be relieved by the 185th Division (Divisional H.Q. at Etricourt).

2. **The 9th Infantry Brigade** (Brigade H.Q. at Le Transloy) will arrange for the relief of the 118th Infantry Regiment in its present sector by the 14th Infantry Regiment, and the **10th Infantry Brigade** (Brigade H.Q. at Rocquigny) will arrange for the 19th Infantry Regiment to take over the sector of the 35th Fusilier Regiment, in which elements of the 88th Infantry Regiment have been put into line during the recent fighting.

The 21st Infantry Regiment will be in Divisional Reserve, and will move to Ytres (Regimental H.Q.) and Lechelle.

The 7th Infantry Regiment, which is now on the move, will proceed to Bantouzelle, where it will be in Army Reserve.

3. **The relief will be carried out** under the orders of the 56th Division.

As **representative** of the 5th Bavarian Infantry Division, Captain Freiherr von Weichs will be at Divisional H.Q. of the 56th Division from 7-9-16 onwards.

The Brigades will each send, by motor car on 7-9-16, a representative (officer) accompanied by a cyclist (9th Infantry Brigade to the 112th Infantry Brigade at Le Transloy, the 10th Infantry Brigade and 5th Field Artillery Brigade to Rocquigny), who will keep in touch with Captain Freiherr von Weichs, the advanced parties of their Infantry Brigades and the Artillery Commander of the 56th Division.

4. **Programme of the relief:** *see* annexe.

Until the various staffs of the 5th Infantry Division have actually taken over the command, those units of the 5th Infantry Division which are not put into front line, but are kept back in Rocquigny, Le Mesnil, Lechelle and Ytres will be directly **under the orders of** the 56th Division.

5. **Headquarters:**

5th Infantry Division.	1st Echelon (Div. Commr., Sections I. and II., Camp Commdt., Telephone Officer, Officer i/c Motor Cars)	Ytres
	Pioneer Commander	Rocquigny
	2nd Echelon	Metz-en-Couture
Artillery Commander (5th Artillery "Brigade")		Ytres
9th Infantry Brigade		Le Transloy
10th Infantry Brigade		Rocquigny

[1] Translation of a German Document.

6. The following are allotted as billets for **resting troops:**

14th Infantry Regiment	Rocquigny
21st	Ytres and Lechelle
19th	Le Mesine
1st Coy., 3rd Pioneer Battalion	Rocquigny
Light Searchlight Section	Le Mesnil
5th Bavarian Trench Mortar Detachment	Rocquigny
3rd Medical Company	Rocquigny

7. Special orders will be issued for **columns and trains.**

8. Sketches on which the **trenches** and the **distribution of troops** are accurately shown (para. 2) will be submitted to the Division by the Brigades after the relief has been completed.

9. Arrangements will be made in writing with the **Town Majors** of Gouzeaucourt, Gonnelieu, and Villers-Guislain to-day, the 6th Sept., as regards the billeting of the units and formations of the 5th Bavarian Infantry Division which will take place in the next few days, viz.:

Gouzeaucourt	by the	14th	Infantry Regiment
Gonnelieu	"	21st	" "
Villers-Guislain	"	19th	" "

The 3rd Battalion, 14th Infantry Regiment, which is billeted in Trescault, will receive its march orders from the 14th Infantry Regiment.

10. **Rations** will be drawn from depôts in Gouzeaucourt and Ytres.

(Sd.) Von Endres.

Distribution:

Division (G.O.C., Sections Ia, Ib, II, III, IVa, IVb, IVc, IVd of the Staff, Telephone Officer, Heavy Baggage, 2 for filing)	14
Pioneer Commander	4
Artillery Commander	2
9th Infantry Brigade } Copies for advanced parties will be	11
10th " " } issued to them by the Division	6
7th Infantry Regiment (Bantouzelle, through the 10th Infantry Brigade)	1
4th Squadron, 2nd Chevaulegers	1
3rd Medical Company	1
8th Echelon Staff	1
56th Division	2
Kirchbach's Group	2
4th Bavarian Infantry Division	1
111th Division	1
185th Division	1
Reserve	2
	50

Received by the 14th Infantry Regiment on 6-9-16, and distributed as follows: 1 copy each to Regimental H.Q., 1st, 2nd and 3rd Battalions.

With regard to the time and method of relief, the O.C. 1st Battalion, 14th Infantry Regiment, will arrange with the 112th Infantry Brigade at Le Transloy,

and the O. C. 2nd Battalion will do the same with regard to the relief on the 8th inst.

The relief will be carried out under the orders of either the 112th Infantry Brigade or the O. C. 118th Infantry Regiment.

The 3rd Battalion, 14th Infantry Regiment, and Machine Gun Company will arrive in Rocquigny at 7.0 p. m. on the 8th inst., and will be in regimental reserve until further orders.

As regards billets in Rocquigny, the 2nd Battalion will arrange with the 3rd Battalion, 14th Infantry Regiment, and the 3rd Battalion with the 2nd through their billeting officers.

The arrangements with the Town Major at Gouzeaucourt will be made by the Regiment.

Regimental H. Q. will be at Rocquigny from 6 p. m., the 7th Sept., onwards.

The 1st Battalion, 14th Infantry Regiment, will instruct 2/Lieut. Dürschner to get into communication at once, as regimental telephone officer, with the 118th Regiment with a view to taking over the telephone lines.

6-9-16. (Sd.) PRENNER.

At 9.45 p.m., 6th Sept., the following message was received from the General Staff Cfficer of the 56th Division:

The 1st Battalion, 14th Regiment, has already been put into second line on the 6th Sept.

The 2nd Battalion, 14th Regiment, will be moved at 8 a.m., the 7th Sept., by motor lorry from Gouzeaucourt to Rocquigny, and put into second line in the evening.

Remarks by the Regiment:

For 3rd Battalion, 14th Regiment, and Machine Gun Company:

The 3rd Battalion will hold itself in readiness to be moved to Rocquigny on the evening of the 7th. The orders for this will be telephoned later.

The Machine Gun Company will arrive in Gouzeaucourt at 10.0 a.m. on the 7th, will man the telephone station there, and will hold itself in readiness to move off the same day.

Instructions for the Employment of Flame Projectors[1]

A. Troops and Equipment

1. Flame projectors (*Flammenwerfer*) are a new weapon for trench warfare. The 3rd Guard Pioneer Battalion (6 Coys.) has been equipped with them and trained in their use. They are under the command of General Headquarters, and will be placed at the disposal, as a unit or by sections, of particular formations for a particular purpose, when they will, for the time being, be entirely under the orders of the responsible Commander, who, after consulting with the Flame Projector Commander and taking the limitations of the weapon into consideration, will give the tactical orders for the assault. The responsibility for their technical employment rests entirely with the Flame Projector Commander.

2. Each company of the 3rd Guard Pioneer Battalion is equipped with 20 to 22 large flame projectors (range of jet 33-44 yards). They will be built into sapheads, advanced galleries, or the front line position. In addition, each company has 18 small flame projectors (range of jet 16-19 yards). These are easily portable and will be carried on the back.

B. Capabilities of Flame Projectors

3. During a flame attack each large flame projector (built in at about 27 yards distance from the enemy's trench), will cover the enemy's foremost trenches with flames on a front of about 55 yards. The enemy in these trenches will either be destroyed or driven off, or if he happens to be in deep dugouts will have his *morale* so shaken that he will allow himself to be captured without resistance. Machine guns, even if provided with overhead cover or in blockhouses, are put out of action by directing the flames against the loopholes. The flame attack lasts about one minute.

4. The front covered by a company of the 3rd Guard Pioneer Battalion is about 1,100 to 1,640 yards. The effect, physical and moral, of such a flame attack on the enemy is very great.

5. The assault will be made by infantry and pioneers immediately after the flame attack. Detachments with small flame projectors will accompany the assaulting troops in order to overcome any resistance which may be offered by blockhouses, etc., and also to spread the fear of the flames to the enemy's rearward positions. Many successive positions can often be taken by assault at the same time.

6. The small portable flame projectors may also often be employed with advantage in combination with bombers in making progress in the enemy's trenches, and for flank attacks on portions of trench, etc.

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[1] Translation of a German Document, dated December 12, 1915.

C. Necessary Conditions for Flame Attacks

7. *For large flame projectors*, trenches, sapheads and galleries must have been pushed forward to within 27 yards at least of the enemy's position at several points, or there must be a prospect that they will be able to approach so near within the next few days.

8. *For small flame projectors*, the portions of trench referred to in para. 6 must be approached under the cover of trenches or saps.

9. In both cases (paras. 7 and 8) an accurate previous reconnaissance of the points at which the flame projectors are to be employed, and of the approaches to them, is absolutely essential. This must be made by the officers of the Flame Projector Battalion. The reconnaissance, transport of the apparatus and other preparations take, as a rule, several days. The building in of the large flame projectors requires 12 hours and can be done without the enemy becoming aware of it.

10. The direction of the wind has very little influence on the effect of a flame attack. A postponement of an attack will become necessary only if there is a very strong head wind.

D. Tactical Employment of the Flame Projector Detachment

11. Flame projectors must be used offensively. It is forbidden to build flame projectors in as defensive weapons in the foremost lines. Small flame projectors may be used, however, to drive off counter-attacks against positions, the capture of which has been facilitated by a flame attack, until such positions have been consolidated. For technical reasons they cease to be effective after about 48 hours. In other special, and quite exceptional, cases when it is proposed to use them defensively, the Commander of the Flame Projector Detachment should be consulted beforehand.

12. Flame attacks proper (*i. e.*, sudden attacks with a number of large flame projectors, without any special preparation by artillery and trench mortars) should be the usual method of employment. The assaulting troops (infantry, pioneers, and the small flame projectors) must advance *at once* (*i. e.*, 1 minute after the large flame projectors have come into action) and take every advantage of the panic caused in the enemy's ranks by the flame attack, with a view to capturing the 2nd and 3rd Line Positions. For the action of the artillery and trench mortars *see* para. 35.

13. If the Commander of the Flame Projector Detachment considers it safe to do so, one or more sections of the front to be attacked may be left untouched by the flames, between the areas covered by the individual large flame projectors which have been built in. The length of such sections may be 100 yards or even more.

14. The fact that the enemy is taken by surprise by the flame attack has much to do with making it a complete success. It is, therefore, of the highest importance that the enemy should not obtain information of the arrival of a Flame Projector Detachment in the Division, etc., or of the sector in which it is intended to employ it. It is consequently necessary that the word "*Flammenwerfer*" should

never be mentioned during a conversation, when speaking over the telephone or in orders. *A code word is to be used, such as "Neue Minenwerfer" or something similar. The Detachment will not be spoken of as "Flammenwerfer" Company, but as —th Company, 3rd Guard Pioneer Battalion.*

E. General Tactical Instructions

15. When giving orders for an attack in which large flame projectors are to be employed, the following points based on previous experience should be considered:

(i.) Objective

16. Exact instructions must be given *how far* the attack is to be *pushed* under the most favorable conditions. It has happened that our troops, taking advantage of the panic of the enemy, have carried the advance too far, thereby coming under our own artillery barrage.

17. In order to ensure secrecy as much as possible, it is advisable that the intended operation should be denominated by a *code word* (in writing or when using the telephone), such as "*Vortrag*," "*Vorführung*," "*Verhandlung*" (Lecture, production, negotiation).

(ii.) Time of Attack

18. As a rule, half an hour, or on dull days one hour *before sunset* is the most suitable time. Only in exceptional cases, when, in the course of the day, the destruction, by artillery or trench mortars, of the large flame projectors which are built in, appears to be fairly certain, may the attack be carried out in the early morning.

19. It is sometimes advisable that the day and hour should not be mentioned in the orders for the attack, but should temporarily be *kept secret*, and should be referred to as "X" and "Y." In later orders, which will be issued in writing only to Battalion, Artillery, and Group Commanders, and the Commanders of independent Companies, inclusive, the time should then be indicated, for instance, as follows: "X" equals 27th Nov. "Y" equals 3.20 p.m.

(iii.) Assaulting Troops

20. The carrying out of the preparations for the attack is often better done if the assault is not made by the troops occupying the trenches, but by a detachment which *has been kept in rest billets.* All troops which up to that time have been in the trenches will then retire to the 2nd Position shortly before the assault, and as soon as the attack by the assaulting party has begun, again move forward into the foremost trenches previously held by them, in order to hold a possible counter-stroke.

21. *The size of the assaulting force must not be too great. The calculation should be one (man?) of the assaulting party to each metre of front. Each party must have a good Second in Command in addition to the Commander.*

22. The individual assaulting columns will be distributed in four successive waves, as follows:

(*a*) **Assaulting Party,** which advances immediately after the flame attack and occupies the enemy's positions. In this party are included bombers, engineers (for the demolition of obstacles) and small flame projectors.

(*b*) **Consolidating Party** for the consolidation of the enemy's trenches.

(*c*) **Communication Trench Construction Party,** to construct communication trenches from the captured trenches to our previous foremost position.

(*d*) **Carrying Party,** which will take forward material for obstacles, especially knife-rests, sandbags, hand grenades and ammunition.

The attacking parties on the flanks will have *several* bombing parties and Small Flame Projector Detachments attached to them to assist them in clearing the trenches from the flanks.

23. Assaulting Detachments and Consolidating Parties will take up positions in the saps or in the front line trenches; Communication Trench and Carrier Parties will be ready behind them in the communication trenches. The stationing of troops in readiness will of course depend upon the existing system of saps, and will sometimes necessitate previous reconstruction of this system.

24. *The division* of the assaulting columns into these parties is best carried out well behind the front. If no other troops are to be employed except those manning the trenches, it is advisable to relieve them, for a short period at least, from the foremost trenches for the purpose of preparation and organization. The troops will march up to their positions in the line in the order detailed for the assault.

(iv.) Preparations for the Assault

25. Special preparations must be made in order that the assaulting troops can mount the parapet rapidly. *Short ladders* with one pole about 1 metre longer than the other are the most useful means. These should be made previously in the Engineer Parks. One ladder is required for every 3-4 men of the Assaulting Party. When being taken up to the front line they must be carried horizontally. They must not be placed in position in the trenches until the commencement of the flame attack.

26. All necessary *matériel,* such as hand grenades, loophole plates, sandbags, knife-rests, barbed wire, entrenching tools, and light-pistols with ammunition must be kept in readiness either in the communication trench depots or with the assaulting columns.

27. *Communication trenches and approaches* must be divided up and *allotted* to the assaulting columns and reserves. Communication trenches, saps, etc., will be distinctly marked with numbers, letters, or names.

28. Should other troops than those holding the trenches be employed for the assault, their officers and N.C.O.s must carry out a thorough *reconnaissance* of their trenches in the early dawn and during the day. No unusual movement, however, must take place in the trenches and there must be no loud talking.

29. The advance of the assaulting troops into the front line trenches and the relief of the troops in the trenches must be carried out in *complete silence.* No

talking is to be allowed. Unnecessary crowding together should be avoided. *Bayonets* will be fixed behind the lines and not in the front line. Rifles must be carried at the trail as far as possible.

(v.) The Assault in Conjunction with a Flame Attack

30. Charges (long or concentrated), to create gaps in our own *obstacles*, will be exploded by the engineers at the earliest 15 minutes *before* the flame attack, and this work must be completed 10 minutes before the flame attack. It will often be found sufficient if, on the night previous to the attack, the engineers cut the wire which connects the knife-rests in front of the foremost trenches. This must be done without attracting attention, the knife-rests being left in their original position until the troops are ready to attack, *i. e.*, immediately after the flame attack, when the engineers will precede the assaulting force, swinging the knife-rests round lengthways at right angles to the parapet.

Engineers will also hurry forward and make gaps in the *enemy's wire* should these not have been made previously by trench mortars or engineer detachments. Obstacles which are not too strong can very often be easily crossed by the assaulting troops, as after a flame attack the enemy fires very little or not at all.

31. The duration of the *flame attack* is only one minute. The signal for it is given by a siren whistle, or at a given time, watches having been previously synchronized. The *assaulting troops* must be *instructed* that they have nothing to fear from the flames and smoke, nor need they fear that they may themselves be caught by the fire jet, as this is cut off by simply turning a tap previous to their advance. They must understand that they can advance immediately after the cessation of the spray without danger, as small bursts of flame on the ground or in the enemy's trenches will burn out at once, and a little fire on the ground is at once extinguished when trodden upon. It is most important to impress upon the troops that the assault is much facilitated by the use of the flame projector, as it has been proved by experience that the enemy fires very little or not at all after a flame attack.

32. The *assault* is made immediately after the flame attack. The *Assaulting Party* charges, followed closely by the *Consolidating Party*. The small flame projectors allotted to the Assaulting Party attack any machine guns that are still in action, blockhouses that are still being defended, etc., with short spurts of fire. They are at the disposal of the Commander of Assaulting Party for this purpose.

It is of the highest importance to drive out the enemy simultaneously to a considerable distance on both flanks by means of bombing and flame projector detachments (*see* para. 22), and to construct sandbag barricades at these points. Communication trenches which lead into the captured position must also be cleared for a certain distance and blocked by constructing sandbag barricades about 27 yards forward of the position won.

The action of the *Communication Trench Construction Party* will commence immediately after the nearest enemy position has been taken. Material is brought up as soon as possible by the *Carrier Party*, which will continue to bring up fresh material from the rear as required. Carrier Parties can at times on their return

journey also take charge of prisoners as far as the point at which the reserves are situated in rear.

It is especially important to bring up and dig in machine guns immediately.

33. It may be of advantage to order a *password* for our attacking troops, especially if several successive positions are to be taken, and in the twilight of dull days. Words which the enemy would find it difficult to pronounce are particularly suitable, such as "*Schweineschmalz*," "*Stiefelwichse*," etc.

(vi.) Action of the Artillery and Trench Mortars

34. In a *flame attack pure and simple*, which is generally to be preferred (*see* para. 12), the action of the artillery and trench mortars will not commence until about one minute after the projection of the flames, when the more retired positions, which it is not intended to take, should be shelled. Barrage fire will be opened on the ground behind these positions and on the communication trenches, etc.

35. Should it be impossible, in exceptional circumstances, to dispense with previous *preparation by the artillery and trench mortars*, only the enemy's rear positions and not his foremost position are to be shelled. It does not matter it this results in the enemy pressing forward into the positions nearest to us in order to obtain shelter, thereby reinforcing the garrison. It must, however, always be borne in mind that by artillery and trench mortar preparation the enemy is warned of an imminent attack, and is thus enabled to take precautionary measures.

36. In most cases, however, it is advisable to request the *Divisions on the right and left* to open with artillery on the enemy's rear positions behind the front which it is intended to capture. Registration must be carried out so as not to attract attention.

37. As a rule it is advisable to detail a *special Artillery Group* to repulse hostile counter-attacks. Its commander must take up his position with the Commander of the attacking force and must arrange for special telephonic communication.

(vii.) Forces on the Flanks of the Front of Attack

38. The effect of a flame attack is sometimes felt to the right and left of the front which is covered with flame. Our troops which are posted on the flanks of the actual front of attack can sometimes, therefore, gain ground by a prompt advance in force. It is, consequently, necessary to keep under close observation the enemy's troops on the flanks of the front of attack, and, according to circumstances, either subject them to a heavy fire or attack them as well. Engineer detachments are to be posted in readiness for forming gaps through the obstacles, should this be necessary.

(viii.) Equipment, Ammunition and Rations

The assaulting troops will wear "assault order." Each man will take his greatcoat, tent square, mess tin, full water bottle, 4 days' rations in his haversack, and, in addition, at least 200 rounds, 2 hand grenades and rifle with fixed bayonet.

The Consolidating Parties are similarly equipped, except that they sling their

rifles (bayonets not fixed). Each man will carry a loophole plate, 50 sandbags and heavy entrenching tool.

Communication Trench and Carrier Parties will appear in their usual order of dress. Only the N.C.O.s will carry rifles. The men of the Communication Trench Party will each carry a heavy entrenching tool, 50 sandbags and at least 2 hand grenades.

(ix.) Telephone Communications

40. A number of infantry telephone lines will be laid from the captured position to the rear, immediately after the assault.

47. All lines leading to the Commander of the attacking force are to be used solely tor service messages which concern the attack, so that he can bring his personal influence to bear upon every part of the front.

Trench Artillery[1]

By E. Van Bode

THE continued and progressive development of the field works behind which the belligerents in the war had become almost immobile caused, in the beginning of 1915, the first appearance of trench artillery, a separate military entity having its own armament, personnel, methods, and tactics. Its early development is rather confused and difficult to follow, but it seems fairly certain that it was in Artois that France, under the urgings of one of her most active and warlike generals, first placed on the front the new arm. The matériel at first was not very serious and only some 130 men were assigned to it, but the results were good. They even surpassed expectations. Trench artillery had proved its right to exist. From that time it grew rapidly in size and in quantity.

It may be worth while to state the reasons for its appearance, or, perhaps better, for its reappearance; for it is, after all, a revival of the trench mortars of the fifteenth century.

The fronts had grown rigid along the western line of battle. The trenches had become permanent, as well as the first lines of infantry which held them. Naturally, in order not to yield ground, to be safe from sudden attacks, from surprises, the adversaries fortified the positions they were holding as well as they could. The positions grew to resemble the entrenched camps of the past, and, as action always causes reaction, was it not necessary to provide an armament capable of attacking field works? But there were already many guns of different caliber and power. Could they not be used for the purpose? No; because they were not adapted to it.

In the first place, the objectives were hard to see. An open trench 2 yards wide is a very large one. The works are made of earth so shaped and disguised as to be difficult to distinguish. An artilleryman 3 miles or so from them finds it very hard to do so. Evidently, it was to his advantage to get as close to his objective as possible.

Then the objectives, by their small size, are difficult to hit. A trench blockhouse will show only a few square inches, a point of support and an armored turret hardly more. The fire upon them has to be extremely exact. Guns 6 miles off cannot be sure of hitting them. Every slight change in the sights will at those ranges make considerable changes in the point of impact. It was necessary to destroy the exact works aimed at. In every one of the blockhouses and redoubts there well might be hidden forces capable of shattering the best prepared assault. It was accordingly necessary to destroy them completely, so that they could shelter neither machine guns nor infantry. It is easy to see that it required a means not only powerful but extremely exact —too exact for batteries which had to be placed well to the rear. With them every increase in range meant an increase in the chances of not hitting. The explosive had to fall exactly on the point aimed at; 2 yards to the front or

[1] *Revue Militaire Suisse*, August, 1917.

rear or side was not enough. There had to be a square hit to crush it as the officer who was preparing an assault demanded. To do this, was it not necessary to be close to the target?

In addition, the works which have to be destroyed are singularly well protected against distant fire. Very often the points are close to each other. Sometimes the advanced trenches are up against each other. Frequently the works to be destroyed are not more than from 100 to 200 yards apart. They cannot be reached by fire from 1½ to 6 miles away. Any shells which fall short would strike among your own infantry. This would not only be bad in itself, but it might go far in demoralizing the troops being prepared for an assault. Accordingly, as no weapon quite met the purpose, a new type—trench artillery—was adopted.

It should also be said that this artillery not only fulfilled the function for which it was intended, but it developed other advantages where value grew steadily more apparent.

Its economic value is considerable. In the first place, it is clear that an army is interested in obtaining the greatest possible value for the mechanical forces which it employs. Accordingly, all destructive effort which can be employed at short range should be. By this means there is an economy in the use of force over employing it at long range.

Take the formula $P = MD$, in which P is the power of the explosive force, M the mass of the projectile, and D is the distance traversed by it; it is evident that if you reduce D you can also reduce P. For example, if you reduce D from 8 miles to 800 yards, you can reduce P from 100 to 10 without changing M. You accordingly save 90 per cent of force without diminishing the effect on the enemy.

But the economy does not end there. The enormous decrease of P permits a corresponding reduction of strength of the gun. If P is decreased from 100 to 10, there is a corresponding decreased pressure on the barrel of the piece. Accordingly, it well might be that in place of a pressure of 50,000 pounds per square inch you have only 5,000 pounds. The difference is enormous, not only on account of the amount of precious metal which is saved, but also on account of the increased simplicity of construction and the reduction in the wear of the piece. These things have a real value today, when metal is almost as rare as coal, when a well-equipped factory is almost as valuable as the workmen, when nickel is ten times its normal cost, when certain specialists among the workmen demand wages five times larger than they received in peace. There are still other advantages in the use of these short-range guns. They need fewer gunners, both officers and men; fewer agents of liaison, observation, etc.

As for that, doing away with the need for liaison and of observation at long range, what a great advantage it is in a time of intense activity when the constant fall of shells breaks up all telephonic communication, prevents the movement of bicyclists, renders impossible all close connection between the front and rear, prevents the front line from signaling when troops are being massed, and the commanders of sectors from indicating the objectives which must be destroyed. With the new guns there are none of these delays. There is no need for losing time. During the

very progress of an assault the trench gun can see at once that a net of machine guns which were supposedly put out of action are suddenly about to open upon a company of its sector. Immediately, without waiting for orders, without losing precious moments, it can crush the machine guns under its great shells.

In short, bringing this new type of weapon into action not only accomplished the purpose for which it was intended, but also gave a number of other advantages. An outline of its development may be interesting.

The factors of the problem being given, a destructive fire at short range, which had to be exact and rapid, what would be the solution?

The obvious thing was to use the existing artillery, or rather modifications of the same artillery adapted to new conditions; that is to say, with a reduction of the charge, of the thickness of the barrel, leaving out the rifling, simplification of the means of checking recoil, and then making a projectile to meet these conditions.

Such was the first trench artillery of different calibers. The weakest did not completely fulfill its functions. Still, it had its uses, whether against light earthworks or against hostile troops, suspicious gatherings, or against similar guns of the enemy.

All of these guns had preserved their accustomed characteristics of a long barrel. They had the same calibers as ordinary artillery and a general resemblance to it, but the barrel was extremely thin and not rifled; in fact, the interior of the barrel was perfectly smooth. This was justified by the difficulty of making not only a rifled barrel but also of having the bands of the projectile take the rifling. Finally, the projectile was modified, not in its general shape, which continued to resemble those of ordinary guns, but by the addition of wings to keep it on its proper trajectory. There were either three, four, or six in rear of the shell, according to the model and the caliber, and both in purpose and arrangement they resembled the features of an arrow. Of course, the projectile did not have to resist the crushing effect of the initial pressure of the gases from the charge, which in ordinary guns may amount to 50,000 pounds a square inch. It was accordingly made with much thinner walls, so that for the same weight one of the projectiles of a trench gun could carry a much heavier explosive charge. Accordingly, one saw shells of about 400 pounds with an explosive charge of 90 pounds.

As for the pieces of small caliber whose shells did not give the whole effect desired, a Belgian engineer succeeded in considerably increasing their power against enemy troops by an ingenious appliance, which was especially effective, as it caused the shell to explode in such a fashion that the fragments were propelled in all directions, so that it was extremely hard to guard against their effect.

Even as they were at first, trench guns rendered such services as to cause a rapid increase in their employment. And yet their utilization was not without inconveniences and even danger.

The first inconvenience was their want of precision. Where they hit was often only an approximation to the point aimed at. This was probably most often due to the wings being bent in transportation, in loading, or in being fired. When they were bent, of course,

the shell did not go true. A second disadvantage was that the guns were so long as to be in the way in the trenches. They required special emplacements, and even then in the advanced trenches it was extremely difficult to provide for defilade. At their first shot (and sometimes before they could fire) these large guns were picked up by the enemy and reduced to silence.

Then these long, slender guns wore out rapidly, even when no accident happened to them, and were out of action. There were even more serious drawbacks, and their employment was not without danger both for the gun crews and the neighboring troops. The greatest danger came from the new conditions under which powder was employed in them. Specialists know very well how hard it is to foresee how the same powder will act under different conditions and under pressures which have not been determined. Now the powder employed had been made to give pressures of over 40,000 pounds to a square inch; it was now being fired in a gun where the pressure was only one-tenth as much; that is, from 4,000 to 6,000 pounds a square inch. The consequence was great differences from the results of the explosion, delays, and hang-fires. Other causes of accidents were ruptures of the walls of the projectiles, injury to the wings, or even to the barrel of the gun. These would sometimes check the flight of the shell, causing an enormous increase of pressure in the barrel, with a premature explosion and destruction of the piece. In short, this improvised arm certainly rendered great service, but it was not perfectly adapted to its purposes.

It was necessary to modify and improve it. The result of the investigations for this purpose gave a very different solution from the one first adopted. The first one, it will be remembered, was the reduction of the initial pressure in the bore. The second was to keep the initial pressure and increase the weight of the projectile.

The equation given above is $P = MD$. It may be changed to $M = \frac{P}{D}$ or $D = \frac{D}{M}$ Accordingly, we can increase M by diminishing D, which was what was wanted. If, for example, in a field gun with 6 miles' range and firing habitually a projectile of 8 pounds, we increase the projectile to 80 pounds, we shall have a range of less than a mile. Of course, all this is a very general statement, and no attempt is made to give exact figures.

The modifications necessary will accordingly be obtained in this case by keeping the same gun, the same powder pressure and providing for a reduction in the range by making the projectile heavier.

Then the technical difficulties, which at first seemed insurmountable, were overcome in an original and ingenious fashion. The projectile, which had to be very heavy, could not be inserted in the barrel. Accordingly, in place of inserting it, it was placed outside capping it, while it was held on the muzzle by a sort of projection which was inserted in the bore. This gave a strange looking piece of ordnance, even stranger looking than the biggest howitzers.

Such is the trench gun known as the ———. The main difficulties, the dangers of the preceding types, had disappeared. The powder pressures were now normal, since about 40,000 pounds per square inch could be developed. This did away with one of the most frequent

causes of explosions in the gun. The wings were outside the barrel, which did away with the chief cause of delay in discharge and premature explosions.

Accordingly, the chief serious drawbacks to the first gun had disappeared. This small mobile gun was no longer in the way. It could be easily hidden. It could be moved anywhere and at any time. It did not wear out any faster than the field piece of the same caliber.

Still the matériel so rapidly invented and put into action—by the end of 1915 several batteries were being employed on the west front—could not pretend to perfection. It was lacking in precision, partly on account of the projectile. Because of its want of stability, recoil threw the piece out of position and off the line of sight; the wings of the projectile were too fragile and were easily bent in transportation. Improvements made in these shells, although overcoming their drawbacks in part, did not completely satisfy the artillery.

Nevertheless it is worth calling the attention of the reader to the fact that this solution so rapidly obtained was both elegant and advantageous; it was an extraordinarily rapid, if not perfect, adaptation of the organ to its function. But that function itself developed as the war went on. The field works which had been held so long took unexpected proportions. Earth and the usual means of construction, wood and materials found by chance, no longer sufficed. The trenches began to take the air of works built for all time. They were lined with cement, stone, sheet iron, iron itself. The shelters were made of reinforced concrete. The redoubts, the strong places, and the machine-gun emplacements were strengthened with iron and covered with steel cupolas.

As the works which had to be crushed became stronger and stronger, the trench guns had to become more and more powerful. The Belgian artillerymen found a new solution for the problem which was set anew. The improved piece fires at short range, is light, and has a heavy projectile. In retaining these necessary qualities they have modified their application, producing a new type of armament which, however, preserves the qualities of the one from which it was derived. It fires at short range with curved fire, in which corrections can be easily and exactly made, on objectives which can be as easily observed as those of its prototype. It hurls projectiles just as enormous, no less powerful; indeed it can fire two kinds, one twice as heavy as the other. It is as easily handled in the trenches, and, in addition, it has new qualities especially valuable when the functions of the trench artillery develops as the enemy strengthens his positions.

Of course it is not possible to enter into technical details, but the new mortar is very small—at 50 yards it is almost invisible. Accordingly it can be carried anywhere, put anywhere, and hidden behind the smallest mound of earth. It can move with the infantry, four men are enough to carry it, and it can be placed in the first line of trenches. The advantages of this are obvious enough—material advantages for fire upon close objectives clearly in view, the possibility of opening fire on the most advanced posts of the enemy, those which are most annoying to the infantry in the first line, and also a moral advantage in the influence, the impression of security and force given

to the infantry by the possession of these guns, whose effect is enormous. Their presence does away with any need for any fire from the field guns over the advanced trenches and accordingly does away with any chance of shells falling short into these trenches. The mortar fires rapidly. Once directed upon an objective, no changes are necessary. The error of fire is hardly 3 yards. Once the objective and range are determined, fire can be continued without correction. Every projectile will give useful effect. This is a very great advantage. The manner of obtaining it is one of the most valuable characteristics of the piece.

Although it seems rather unbelievable, these results have been obtained both in trials and in combat. We have seen them more than once. It was worth while to see the infantrymen in the trenches nearby forgetting all danger, ignoring the enemy 30 yards away, stand up to see the effects of fire, and cheer as the shells fell, one after another, exactly on the target. Then the value of such qualities in a trench gun was apparent.

This accuracy is not obtained at the price of slowness of setting. Not at all. Changes are made with extraordinary rapidity and accuracy. A gun pointer of a field piece would be surprised to get the order, "New objective, a yard further," and yet with this piece it is given with a part turn and the shell drops in the place indicated. Changes in azimuth are made quite as easily, for the gun moves on a mount which enables it to be rotated in a complete circle. Changes in elevation can be made with an accuracy which at nearly a mile gives an error of only about 3 yards.

If we would appreciate the value of these qualities we should also consider the variations possible in the projectiles used. The principal ones are two shells, one of 38 pounds, and the other of 72 pounds, whose destructive effect is enormous.

To forget nothing we should add that this mortar is very easily made in ordinary workshops where there is no accumulation of machine tools, no costly machines and expensive workmen; its manufacture does not require great masses of specially cast steel, for it can be made from 3-inch bars, a commercial size.

Finally, its maneuvers are so simple, it is so light, so easy to move and put in battery that, if needed, four gunners are all it really requires and a noncommissioned officer accustomed to it can perfectly well command it.

Can we accordingly conclude that the last word has been said in trench guns?

Now field works continue to grow more complicated. Lines of trenches have succeeded a line of trenches and small forts are behind small forts. Field guns have enough to do in hammering the ground from a distance, in pulverizing the villages, in throwing barrages of great width and depth. The trench artillery is now called on to increase its range and to destroy objectives a mile and a half away.

Therefore, to the great relief of the normal type of artillery and to the great damage of the enemy works, the organ continues to be adapted to its function, that new organ which is called trench artillery.

Varied Ground

Cambrai

The first week of December, 1917, was decidedly bad for the Entente. The British before Cambrai lost the greater part of the ground which they had gained by surprise on November 20. The number of prisoners and guns which the British left in the hands of the enemy is nearly equal to their trophies of the three first days. The initial victory was nearly turned into a defeat.

The word "nearly" is used intentionally. The extent of the reverse should be exaggerated no more than should that of the success. Both the British and the Germans can stand the losses of some villages, of some ten thousand prisoners and some hundred guns. It will not overwhelm them. Besides, the German counter-attack did not completely reestablish their situation. Some 10 kilometers of the Hindenburg line is still in the hands of the British. The Germans find themselves in positions which have been so shattered that they cannot be favorable for defense or for the continuation of the attack.

The German wall has one more breach than it had three weeks ago. The defense has prevented the assailant from passing through the breach. The defense has not been able to drive him from it. In short, the assailant keeps his advantage. The Germans took ten days to prepare their counter-attack, of which the actions round Bourlon were only the prelude. The serious attack did not begin until November 30. A powerful force was employed. Attacked simultaneously on both flanks the British did not defend themselves very well. The tenacity and bravery which they have so often shown did not suffice to check the German drive. On the first day several villages were lost back, the whole position had been fought over and some thousands of men and many guns remained in the hands of the enemy.

It is true that counter-attacks for the moment reestablished the situation, but on the following days the British, with rather little resistance, evacuated village after village. Today they hold only a rather narrow strip of the territory which they conquered so brilliantly twenty days ago.

How can this reverse be explained? The Germans cannot have drawn very heavy reserves from the Russian front in ten days. With those they could draw from the vicinity it is not probable that they could have had any great numerical superiority about Cambrai in men or in guns. Accordingly one is lead to believe that the tactical superiority of the British over the Germans is not definitely established. The trade of war is not one of those which can be learned in three years. The Germans have been practicing it for centuries; the British are beginners in it. In the war of trenches they are already past masters; in the war of maneuver they have taken their first lesson.

In the army which has just been checked in front of Cambrai everyone, generals, officers and men, saw for the first time in front of them something besides a labyrinth of trenches and obstacles. Neither from their experience of war nor from their profes-

sional education did they find the proper solution of the new problem.

The passage from the war of position to the war of movement is the most delicate operation of modern war. The Austro-Germans have succeeded in it several times, the Russians once, and the French and British have not succeeded yet. Instructed by their failures and success, the Germans know how to enlarge the gaps they have made in the enemy line and how to drive back the enemy who has pierced theirs.

The British army of before the war does not exist. Besides, that army had but small experience of grand war. The new army, which, it may be said, has been completely built up and created during the war, has been organized, trained and equipped for the immediate purpose of trench war, first defensive, then offensive. Undoubtedly its organizers and commanders have a little lost sight of the real purpose of an army—war of movement which alone can give decisive results.

The British infantryman has been admirably trained to fight with bombs and the bayonet, to attack trenches and to mop them up. In the open field he must find himself somewhat out of his element. In the same way the artilleryman accustomed to immobile and inert objectives must have some hesitation in directing his fire on thin lines of skirmishers and mobile batteries. The commanders must also have hesitated in throwing their reserves into the furnace or else they did not recognize in time the decisive place and moment.

Perhaps they did not expect to pierce the lines so easily at Cambrai and, surprised by their own victory, they did not know how to take advantage of it.

The lesson of Cambrai has been hard for the British army. With their methodical spirit the lesson, without doubt, will be profitable. The next time they pierce the German line the generals, officers and men who have shared these late hard experiences will know better how to adapt themselves to circumstances which will no longer be new for them.—Colonel Lecomte, *Gazette de Lausanne*, December 12, 1917.

Note.—The Infantry Journal has been saying that something more than knowledge of trench warfare will be needed to win this war. What Colonel Lecomte says is interesting and certainly worth consideration. The opportunities from which alone a decision can be obtained are fleeting enough. How is the utmost advantage to be taken of them? Only by thought and planning based on intelligent anticipation and the formation and practice of a trained operations staff which foresees how a decision is to be won.

At the Front in Flanders

Anyone who might happen to look at the German first line of defense would ask himself in vain where the defensive works, the obstacles, are, about which he has read so much at home. He sees no trenches, no wire entanglements, no mine tunnels, etc.

One sees close together yawning shell craters. These craters are three-fourths filled with rain water. One involuntarily asks himself: When they are full, what then? Are these cavities the only shelter for the men of the first line? they now crouch along the upper edge of the crater, on the front side, and in that way escape the splinters of the hostile shells. If, however, a shell

falls squarely into the crater, then this shelter, too, is illusory.

The wet soil has at least one good point—it catches the hostile projectiles like tough glue. The shell fragments rise almost vertically and scatter, in a radius of about 2 to 3 meters only, in all directions. For that reason our crater garrisons crouch and lie on and in the saturated soil. When they are relieved at the expiration of two days, a coating of clay an inch thick has accumulated all over their bodies, and they have lost the semblance of human form.

When the crater is entirely full, the first line defense men must plunge right into the cold water. During long continued drum fire, they lie there for hours at a time in the slimy liquid, and long for the moment the enemy infantry attack will compel them to crawl out of the terrible holes and warm their numb limbs.

Anyone falling into this swamp is lost. If a horse falls in he is shot, as it is impossible to get him out. In spite of this fearful existence it is the unanimous opinion of our officers that the confidence of our men in ultimate victory is undiminished.

The care of the men is sufficient, indeed good, and keeps up their mental and physical forces. Refreshing and hot drinks are brought to them whenever possible. As a matter of fact this can only be done at night.

The relief of the men is accomplished as follows: The soldiers spend two days in the first line, two days in preparation, and two days in the reserve. The artillerymen do not have relief so often as the infantrymen. Because of the numerical superiority of the enemy they often have to hold out for weeks in their firing positions. As the water is so near the surface the men cannot dig in, and the pieces have to be fired without any cover.

If their position is discovered, they have to be moved quickly in order to avoid annihilation. Artillery fighting is all the more difficult as the English use large caliber pieces almost exclusively. They have an enormous number of those. They are said to have used their light artillery in many cases for arming their merchant shipping. Many gun crews have been detailed for that purpose.

The British seek to embellish the lack of success of their twelve great days of battle by saying that their losses have been very small. They have sent special emissaries into the neutral countries in order to spread their report. Their own casualty lists, however, show that since the 1st of August they have lost an average of 100 officers daily. Their sanguinary losses in soldiers have been in proportion. After one of the recent battles, 500 English corpses were counted before the front of one single German battalion.

This war brings rapid changes and successive novelties in all departments. Lack of space forbids the mention of all the phases of their development here. The most recent battles were fought through in a form of fighting, which the local limitation of the war objective allowed one to apply.

I was shown the sketch of a fight, found on the dead body of an English officer after the storm on the village of Gheluvelt. The objective lay only one kilometer from the starting point. Even more interesting was the graphic representation of the progressive fire

zones of the barrage which the English now like to lay before their waves of storming troops. This barrage is designated by the Germans as "fireroller" (Feuerwalze).

Their slow progress, which is, however, hard to stop, allows the English to secure but a small territorial gain at first. Their rearmost waves at once dig in, in so far as the swampy nature of the soil permits it. The German counter-attack soon strikes against a slightly intrenched position. The longer the counter-attack is delayed, the more bloody it is bound to be. If one wished to dispute the enemy's first territorial gain, one would have to make the first line very strong.

By so doing the initial losses would be materially increased. If, on the other hand, it makes the first line very thin, it will undoubtedly be broken through by the enemy masses. These circumstances are only mentioned to show what tactical difficulties have to be contended with. A particular difficulty lies in the often recurring necessity of having the counter-attacking troops pass through the hostile barrage.

Intense as the barrage is, and close together as are the striking points of the projectiles, there are always narrow gaps to be found, which the German leaders know how to utilize in a masterly fashion. These small gaps are passed at a quick run, in a single file in squads. If the attempt is successful, the losses are quite small.

In the last battle, on October 30, the British made use in certain sections of a form of fighting borrowed from the French. The Germans call it the "Fire Bell" (Feuerglocke). It has received the name because, like a bell, it is enclosed on three sides. The enclosing is accomplished by a barrage fire in front and by an accompanying "bolt fire" (Riegelfeuer) on both sides. In all probability, however, the English will stick to the "Fireroller."

If it should yield them under the most favorable conditions a kilometer of territorial gain on every day that a great battle is fought, British stubbornness calculates that by spring they ought to be somewhere near Bruges.

This calculation shows every evidence of being highly improbable. On the front of the fourth German army, in the most dangerous place, the English, after three months of herculean effort, have only succeeded in penetrating to a depth of 5 kilometers; a little further on they have only penetrated 3 kilometers, and a short distance further on they have not even made a dent in the German position. Moreover, the winter rains that will soon set in will not allow of fighting in the knee-deep clay mud.

The Hindenburg supreme command has shown that it is not at a loss for new and quite surprising methods. For the present all the exertions of the English against the pillars of the German main position have failed. These positions are Houtholst Wood and the Polygon Wood near Gheluvelt, and this village itself, which the Germans still hold strongly. The former wood, covering about 16 square kilometers, belonged to Prince von Ahremberg and contained very tall trees. Now they are all, almost without exception, broken off and the splintered stumps offer a desolate appearance.

In spite of all this the animals inhabiting the woods have not abandoned their homes. Recently there was a recrudescence of fighting near Dixmude.

This place, which is the point of exit from the inundated territory, lies under concentric German fire. It will be difficult for the English to find a space large enough for them to march up on, to the east of the inundation, for which they are responsible and which they now deeply regret. That they will make the attempt, however, is not improbable.

In conclusion we must emphasize the fact that the German soldiers are serious, that they are energetic and long for battle, and that they are confident of victory. Our successes on the Italian front have made them joyous. When the news of the battle of Tagliamento was made known to the troops, such an old-time, vigorous German cheer sounded over to the English, that the latter must have heard it in spite of the roar of the guns.—Lieut. General von Ardenne, *Berliner Tageblatt*, November 7, 1917.

High-Rank Losses — What Can Be Deducted from Them

The briefest survey of the more recent casualty lists must have caused even the lay mind to remark that there has been an appreciable increase in the casualties falling to service officers—brigadier generals and colonels—and in all ranks of the Royal Field and Royal Garrison Artillery. It will also have been observed that in all recent actions in Flanders the number of enemy prisoners has been small in comparison with the captures made during our victories earlier in the year, while, though our efforts have enabled us to occupy enemy territory, yet our captures have not included any considerable quantity of field ordnance, and of position ordnance none at all. These few facts are remarkable in that one is able to construct from them a far truer picture of the actual conflict now raging in Flanders than from the evidence of the professional chroniclers.

Let us take the few facts we have culled from the data published officially in the order that we have placed them. Is it just a misfortune of war that so many brigadier generals and colonels commanding battalions have been killed and wounded recently, or does it mean that the methods of defense with which the Germans now seek to counter our offensives are such that the unravelling of each local situation in a fight requires the immediate presence of the more senior officers in order to ensure continuity of effort?

Our Superior Tactics

What do the enhanced casualty totals in the two artilleries mean? The suggestive and hasty critic will at once say: Enemy ground and aerial observation good and counter-battery work superior to our own. To this he will add riders of hostile air supremacy and more accurate shooting. It is in reality nothing of the sort. It is very significant of the great changes which the enemy have introduced into their principles of land defense—changes which, it should be remembered, our superior tactics have imposed upon them—changes which, within a measurable space, will accelerate the enemy's defeat, unless some exterior influence intervenes. The very reason to which our present heavy artillery loss is traceable is responsible for the small captures that our recent advances have brought in enemy ordnance. No army on the defensive could support for long a sequence of buffets such as the Germans sustained at Arras, Vimy, and Messines. German Staff ingenuity

had to invent some alternative that in defeat was less costly in matériel and man power. The result of this endeavor—and the ingenuity of the German military mind has to be admitted and respected always—has been the new character of defense which we have met in the recent Flanders fighting, and which is directly responsible for the remarkable side shadows which can be culled from official *communiqués*.

The Enemy Plan

The new German system is this—a loose, ill-defined front area, reinforced with cunningly emplaced machine guns. This ill-defined front area is calculated to a depth that will bring an enemy assault to its weakest strength. That is to say, the assaulting ranks will be attenuated by casualty, weary by the labor of the advance, devoid of momentum, and disintegrated as all battle-fighting troops must become. This calculated depth will synchronize with the effective range of the German artillery. To give it this effect the German artillery does not lose its mobility in battle, for as far as the German calculation goes the battle in its effective stage does not begin until the assaulting hostile infantry has reached the far limit of their own loose front defense. There, upon the tired, disintegrated, and harassed assaulting enemy they turn loose their effective barrage, and pour in their counter-attack with fresh seasoned infantry that have been held in reserve for this purpose. Here you have the picture of the latest development of the infantry and artillery fight in France. The serious battle begins when the assaulting allied infantry have already fought a strenuous fight. The assault situation that then develops is so delicate that it has to be handled at once by those of a rank that can take a responsibility and make an instant decision. The guns have to come forward irrespective of cover or other usual precautions, otherwise the Huns' heaviest punches, to borrow a prize ring phrase, cannot be countered in time. But in breaking the blow of a heavy "punch" punishment has to be sustained.

There is nothing very new about all this. Much savors of the obvious. Yet, although our military text-books have always prescribed that personal reconnaissance was incumbent upon an officer exercising senior command, the same text-books never presupposed a personal reconnaissance across a 50-acre rectangle parqued chequerwise with machine-gun emplacements.—*Manchester Guardian* (England), October, 1917.

①

Machine Guns

A machine-gun corps was established in the British Army by orders of October 12, 1916. It is divided into four branches: infantry, cavalry, heavy, and motors. The infantry and heavy branches were organized in companies, the cavalry in squadrons, and the motor branch in batteries.

Officers were obtained by commissioning selected cadets from the machine-gun corps cadet battalions and by transfer. All officers serving with the corps were to be promoted on one list, and all promotions were to be temporary.

Of course, there have been changes in the organization of the corps since this order, but the corps itself has grown steadily more important. This British solution of a difficulty is interesting in connection with the article in this number.

Editorial Department

Discipline

By the time this number of the INFANTRY JOURNAL reaches our readers, "Lectures on Discipline and Training," by Colonel Applin, of the British General Staff, will have been distributed as a War Department Document (No. 746, Office of the Adjutant General, February, 1918).

There are so many of these documents that not everyone who receives them reads all he receives. Of course everyone should do so, but there is something about government documents which invites perusal only during office hours. Office hours are very well occupied already, and there are not so many government documents which one would read at all if a knowledge of their contents did not seem necessary for some reason or other.

Colonel Applin's lecture is not in the class of things which are worked through only from a sense of duty. We cannot imagine anyone leaving it unfinished when it is once taken up.

He speaks with authority, for he, an officer of the old army, has seen the development of the British new armies which now defend so much of France; armies which now, and with reason, feel that what they want to do they can do, when the hour and place have once arrived. He does not believe that discipline is any inner and spiritual grace. It is something to be borne proudly, as armor used to be. He believes that an army is smart and exact or it is in danger of collapse in an emergency, and armies are supposed to be prepared to meet emergencies. He is undoubtedly right when he says: "The Russian Soldiers' and Workmen's Congress passed this resolution, 'The men will not in future salute officers.' Now isn't that a trifle? Yet that small trifle has led to the telegram that reads, 'The troops have left the trenches. The artillery is being sold. Officers are serving as cooks and orderlies.'"

It has been our habit to be rather easy-going in the outward signs of discipline, in the belief that, after all, the essential facts are there. But are they, unless the outward signs are there too? We doubt it. In this war, response to orders must be instantaneous and exact. If it is not, failure confronts the man charged with the operations. Colonel Applin tells us what we have to do and how to do it. He has been through the war. He knows what a dangerous and monstrous thing is the power against which we are arrayed. He realizes, in a way no man can who has not actually been in Europe since 1914, the danger we are in. We are in danger, very grave danger, for, as a German truly said lately, "If we do not lose, we win. If our enemies do not win, they lose."

Φ

'98 and '18

It is not a difference of nineteen years. It is something much larger than that. Then we were volunteers. Today the Government of the United States has stretched out its hand, touched certain men on the shoulder, and said, "Put down those tools, leave your desk, and come to war." The Government has assumed certain obligations toward these men, for they have not come of their own choice but at the order of the United States.

The feeling that this is the case is probably largely responsible for the non-military activities which are centered about the cantonments of the army and which so strongly differentiate '18 from '98. Then we were volunteers. We expected adventure, hardship was part of the game, we would have been disappointed if we had not found it, and we did, while the memories of the Civil War were by no means as dimmed as they are today. The Civil War was hard; it was fought on hardtack, salt pork and whiskey. Twenty years ago our fathers talked to us about what they had been through, and we knew that their way was the only way to fight a war. It was whiskey, not chocolate sundaes, which cheered the men of that epoch.

It does not mean that our grandfathers were reprobates. Indeed toward the end of the Civil War a wave of religious fervor passed over both armies, but it led to a renunciation of the temptations of life because of a full realization that they were temptations. It is different today. An appreciation of the obvious expediency of physical and mental hygiene has rather taken the place of a stern renunciation of the joys of life.

Indeed the world one's grandfather lived in has become a remote world with no apparent connection with our own, and no lamentations of our own degeneracy will bring it back. If we win, we must win in our own way, and time is very short. We draw rapidly near the decision over there in France, and we must take our part in it. It may be that the activities of the well-meaning agencies which surround and share in the work of our cantonments are preparing the soldiers of the United States to be better citizens, but are they training them for war? That is what the cantonments are for, and time is very short. There is nothing kind about this war. The game laws are off. We are training to kill Germans, for if we do not kill them they will kill us.

Amusement centers, libraries, singing associations and dances have their part in making this world a better world to live in, but we must, every one of us, remember that, unless we win this war, it won't be this world at all. It won't be the world we know, and it's fair to assume that the world we know is the one we want to continue. We have to fight for it now, and fighting is both hard and cruel work, but then it's man's work and in it there is no place for neutral and epicene virtues. Time not spent in training for war in the cantonments is lost time. After we have made this world safe for ourselves will be time enough to cultivate the charms, the refinements, the comforts of life. We are in this war and we are the last reserves. We are hardening the bodies of the men in the training camps. Are we hardening their souls?

Book Reviews

Topography and Strategy in the War, by Douglas Wilson Johnson. New York: Henry Holt & Co., 1917. Price, $1.75.

This valuable book treats the war from an aspect which is not always considered. It gives a good summary of the course of the campaigns, and then describes the topography of the countries where they were fought, and shows how inevitably it influenced not only the strategy but the tactics of the military operations. For example, when the operations in France are considered, the fact that the rock layers slope toward the center of the basin in which Paris lies has one striking result of profound military importance. Every plateau belt is bordered on one side by a steep, irregular escarpment, representing the eroded edge of a hard rock layer, while the other side is a gentle slope having about the same inclination as the dip of the beds. The steep face is uniformly toward Germany, the gentle back slope toward Paris, and the crest of the steep scarp always overlooks one of the broad, flat lowlands to the eastward. The military consequences arising from this peculiar topography will readily appear. It is not difficult to understand why the plateau belts have long been called the "natural defenses of Paris."

As American soldiers are fighting in France, those who are going there will find the descriptions given in this book of the terrain over which they are operating are well worth reading and considering. The book is fully illustrated.

Rapid Training of Recruits, by M. V. Campbell, late Lieutenant, United States Marines. New York: Frederick A. Stokes Company, 1917. Limp cloth, 16mo, 180 pages. Price $1.

This manual is by the author of "Practical Bombing," which has already enjoyed a particularly large sale, and another book by the same author should meet with a ready response. The author, formerly an officer in the Marine Corps, answered the call of the blood, and is now back in active service again with the artillery in France.

The plan outlined for the training of recruits is not a theoretical one, but a definite record of what has actually been accomplished over a period of months. The manual itself is an adaptation of an English publication.

THE UNITED STATES INFANTRY ASSOCIATION

"The object of the Association shall be to promote the efficiency of the Infantry arm of the military service of our country by maintaining its best standards and traditions, by fostering esprit de corps, by the dissemination of professional knowledge, and by exchange of ideas as to the utilization of such knowledge with particular reference to the rôle of Infantry in modern war."—Article III of the Constitution.

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Change of Address

It is becoming increasingly difficult with each issue of the INFANTRY JOURNAL to keep track of our members and subscribers. They frequently do not know long in advance of impending changes of station, and do not notify us in time to make the necessary alterations in our mailing list. The inevitable result is that some copies of the JOURNAL go astray, much to our regret, and to the disappointment of the subscriber.

It is because of this possibility of loss of a single issue that we are repeating certain facts in regard to the changes recently made in our custom of mailing the JOURNAL to members without formal notice from them of a desire to continuously receive it. Economic reasons made it necessary for the Executive Council of the Association to adopt the rule of mailing the INFANTRY JOURNAL only to those members and subscribers who have been thoughtful enough to pay their subscriptions to date.

In carrying out this necessary policy, we will send an advance notice to members and subscribers of the date upon which subscription to the JOURNAL will expire. On receipt of this notice, the subscriber should immediately remit the amount due for renewal of subscription. This is the custom of all regular periodicals, and at once puts the magazine on a business basis. The receipt of renewal blanks by us will give notice of the number of copies necessary to print of each issue, and save waste and expense through overestimating the requirements, or disappointment of subscribers through underestimate.

A word about the necessity of keeping the office advised of changing addresses. The Army is on the move. Wherever our subscribers may be stationed, or however arduous their duties, we will try to make the INFANTRY JOURNAL a necessity to them in keeping up with the changing tactics of the day. We ask the cooperation of subscribers in writing direct to this office. No dependence should be placed on mail agents or postmasters forwarding copies from old stations. The regulation that this be done is more honored in the breach than in the observance.

As a favor to us, talk about these paragraphs whenever you foregather with your brother officers. Perhaps some one of them may not have read them, and will be grateful for having them brought to notice. Use the blank below.

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